THE BATTLE FOR AIR SUPREMACY OVER THE SOMME, 1 JUNE-30 NOVEMBER 1916

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by

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Much has been written about the Battle of the Somme. From July through late November 1916, British, French and German armies fought one of the costliest battles of the 20th century. Well over a million casualties and only a few miles of ground gained by the Allies were the result when the battle ended. Little, however has been written about the second battle which occurred simultaneously, this one in the skies above the Somme, where for the first time in the history of warfare a deliberate attempt was made to control the sky. The British Royal Flying Corps, under the resolute command of General Sir Hugh Trenchard, fought to gain air supremacy from the German Air Service. Trenchard believed that the best way to support the ground force was to dominate and control the sky above the battlefield. This air campaign was critical because of its impact on the doctrine and theory of air warfare, which followed it.

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ABSTRACT

THE BATTLE FOR AIR SUPREMACY OVER THE SOMME, 1 JUNE-30 NOVEMBER 1916, by LTC Thomas G. Bradbeer, USA, 119 pages.

Much has been written about the Battle of the Somme. From July through late November 1916, British, French, and German armies fought one of the costliest battles of the twentieth century. Well over a million casualties and only a few miles of ground gained by the Allies were the result when the battle ended. Little, however, has been written about the second battle which occurred simultaneously, this one in the skies above the Somme, where for the first time in the history of warfare a deliberate attempt was made to control the sky. The British Royal Flying Corps, under the resolute command of General Sir Hugh Trenchard, fought to gain air supremacy from the German Air Service. Trenchard believed that the best way to support the ground force was to dominate and control the sky above the battlefield. This air campaign was critical because of its impact on the doctrine and theory of air warfare which followed it.

This study examines the efforts of the Royal Flying Corps to gain air supremacy against the German Air Service before and during the Battle of the Somme.

DEDICATION

To the 499 British aircrew who were killed, wounded, or listed as missing during the Air Battle over the Somme in the summer and fall of 1916. Their gallant struggle, and for many their supreme sacrifice, would have a lasting impact on every air campaign that followed in the twentieth century. They have not been forgotten.

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ACRONYMS

RFC	Royal Flying Corps
BEF	British Expeditionary Force
RNAS	Royal Naval Air Service
SQDN	Squadron
FLT	Flight
VC	Victoria Cross
BE2C	Bleriot Experimental 2C
FB5	Fighting Biplane 5
FE2B	Fighter Experimental 2B
DH2	de Havilland 2
KeK	Kampfeinsitzer Kommando (First independent German fighter units consisting of four Fokker Eindecker aircraft)

ILLUSTRATIONS

CHAPTER 1

INTRODUCTION

April 1916: It had been just over three months since Field Marshall Sir John French was removed from command of the British Expeditionary Force (BEF), primarily because of his failure to employ his reserve in a timely manner during the Battle of Loos.[1]

Field Marshal Sir Douglas Haig, as of 19 December 1915, the new Commander in Chief of the (BEF) in France, had his staff planning a major ground offensive against the Germans to occur in mid summer 1916. The original plan called for a joint attack with the French. The British would attack north into Flanders as the main effort and the French would attack along the Somme as the supporting effort.[2] Haig took comfort in the fact that the experience of a veteran French Army on his right flank would offset the inexperience of his own divisions.[3] The original divisions of the BEF had largely been destroyed in the first two years of the war. He needed time to train his new divisions, part of the British Secretary of State for War, Field Marshal Lord Horatio Kitchener's all-volunteer army, who were still arriving in France during the winter and spring of 1916.

The plan for the British summer offensive changed drastically once the Germans, somewhat unexpectedly, attacked the French fortress city of Verdun on 21 February. Because of this major attack, the French had to shift reinforcements from the northern sector of the Western Front, south to Verdun (see figure 1). The French were forced to relinquish almost 100 miles of their sector to recently arrived and inexperienced British divisions. The French Commander in Chief Marshall Joseph Joffre announced that his forces would now only attack along an eight-mile front on the Somme instead of the

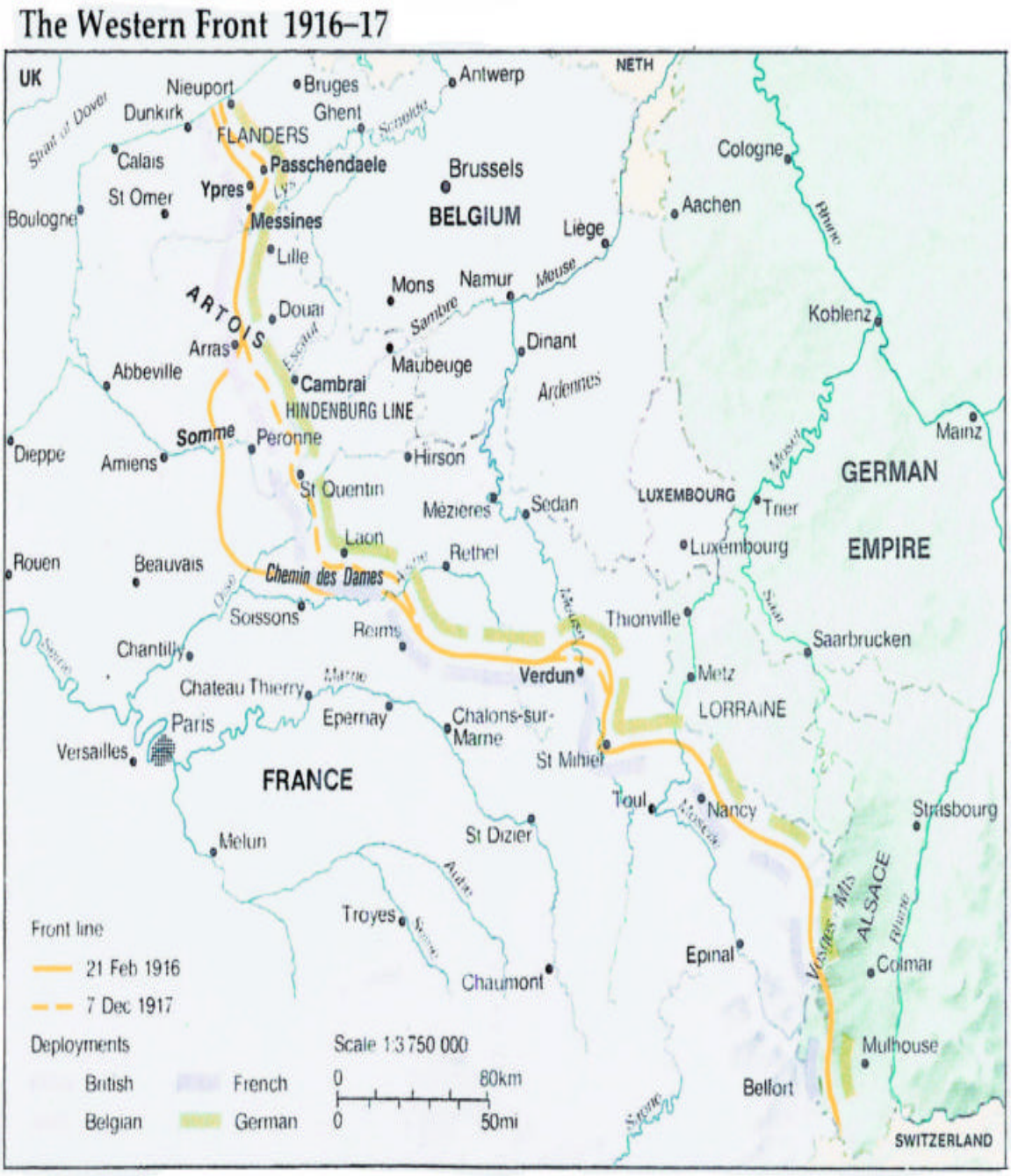

Figure 1. Western Front, 1916

Source: J. M. Winter, *The Experiences of World War I* (New York: Oxford University Press, 1989), 17.

twenty-five miles they had agreed to. Furthermore, Joffre demanded that the British launch their offensive sooner rather than later, stating that 1 July was the latest the French could hold on at Verdun or without pressure on their flank, the Germans might succeed in taking Verdun and possibly win the war.[4]

The first of July was the date forced on Haig to commence his summer offensive. Reluctantly Haig realized that he could no longer contemplate attacking into Flanders and his main effort would have to be against the German forces opposite the Somme. He had five armies under his command, covering eighty-five miles of French territory; this compared with the French sector of the front of almost 300 miles and the Belgian of fifteen miles.[5] Meeting with his army commanders Haig stated that the Somme offensive would have three objectives: to relieve the French at Verdun, to inflict heavy losses on the German Army, and to place the British Army in favorable positions to win the war in 1917.[6] He also notified General Sir Henry Rawlinson, commander of the Fourth Army, that his army would be the main effort for the coming offensive.

Brigadier General Hugh Trenchard, General Officer Commanding, Royal Flying Corps (RFC), was concerned when notified of Haig's intentions. How could his small force, that began the war less than eighteen months before with four squadrons (sixty-three aircraft--of more than a dozen different types), with fifteen squadrons, of which only two were equipped with fighter aircraft, gain control of the sky above the Somme and simultaneously provide adequate support to the British Fourth Army when it attacked?

According to Trenchard's biographer, Andrew Boyle, the RFC commander's indomitable leadership and fierce drive would carry the air service only so far.[7]

Trenchard needed help from his commander and he needed help from his government. Without it, the RFC would not be able to support Haig, Rawlinson, and the summer offensive.

Trenchard had earned his pilot's certificate at the age of thirty-nine by soloing with only one hour and four minutes of flying time. He only met the entrance requirements into the RFC by several weeks, due to his age and late start at flight training. As a lieutenant colonel he had commanded the First Wing, RFC, during the Battle of Neuve Chapelle in March 1915 where he worked closely with Haig. When the Commander of the RFC Major General Sir David Henderson was called back to England to become the Director General of Military Aeronautics in August 1915, Trenchard was promoted to brigadier general and given command of the RFC on the Western Front. Brilliant, dynamic, intolerant of failure, but also inarticulate, he had an air of charisma that overcame his shortcomings.[8]

From 1914 through early1916, the RFC had become extremely competent in three key areas that directly supported the ground commander. According to H. A. Jones, one of the official historians of the RFC, in his work *The War in the Air,* Volume 2, these tasks were: aerial reconnaissance, aerial photography, and directing and observing artillery fire.[9] But Trenchard's vision included a much more important, overarching mission that the RFC must accomplish if they were to truly support Haig and his armies: Supremacy of the air over the battlefield. Trenchard with much assistance from his aide Captain Maurice Baring defined air supremacy as a state of moral and material superiority over the enemy which would prevent him from seriously interfering with hostile air operations and at the same time deny him the successful use of his own air

assets. He further added that the opposing air service would be incapable of effective interdiction against both air and ground units.[10]

Given the fighter aircraft that were then being developed back in the United Kingdom and given adequately trained crews, he firmly believed that his vision could be attained in a matter of weeks. To maintain that supremacy over time, however, would require tough and dedicated leadership, almost superhuman effort from the aircrews, many aircraft losses, and many aircrew lives. If it prevented the enemy from obstructing the ground force in accomplishing its objectives, then the losses were acceptable. Above all else, Trenchard firmly believed that the RFC was part of, and entirely subordinate to the needs of the British Army and that whatever Haig and his subordinate commanders required, the RFC must accomplish.[11]

Haig fully supported Trenchard's vision and took his argument back to the government in London. Little did the Germans know that the air war in France was about to change significantly and for them it would be for the worse.

This study will focus on the British RFC struggle to gain air supremacy in the spring of 1916, how they achieved air supremacy over the Somme battlefield and if they maintained that supremacy for the duration of the battle. The intent is to analyze how the RFC, with insufficient crews and outdated aircraft, was able to wrest control of the skies away from the German Air Service. In addition, how they established air supremacy for more than six months while supporting Field Marshall Haig and General Rawlinson's Fourth Army during the Somme offensive of 1916. A key figure of this analysis is General Sir Hugh Trenchard, Commander of the RFC in France. He believed that the

airplane, if used in an offensive manner, would ensure air supremacy above the battlefield.

The analysis will include a brief history of air warfare from 1914 to 1916, up to the preparations for the Somme battle and how the "Fokker Scourge" forced General Trenchard and the RFC to modify their tactics to overcome German air superiority. The analysis will also focus on several tactical leaders of both the British and German air services and how their decisions and actions made a contribution to their respective forces during the air war over the Somme. The development of both British and German air strategy prior to, during, and at the end of the battle of the Somme and its implications on the remainder of the war will also be examined. A critical piece of the analysis will also examine how both the aircrews and aircraft on both sides had an enormous impact on the air battle and its outcomes.

When the First World War began in August 1914, the airplane was viewed by most European generals as a new piece of technology that was too complicated to be understood and even worse, offered little to the military. Several of the more renowned military leaders, such as General Sir Douglas Haig openly criticized the airplane, stating it would never replace the cavalryman and his horse for reconnaissance purposes.[12] However there were some visionaries (many of them were pilots), who saw the potential of the aircraft as a weapon system.

During the First Battle of the Marne in September 1914, the British, French, and Germans used aircraft to follow and report on the movements of the opposing armies. The RFC, established out of the Royal Engineers only two years previously, had provided an enormous service to the Commander in Chief of the BEF Field Marshal Sir John

French. The RFC, acting in a strictly reconnaissance capacity, had detected the Germans efforts to encircle the BEF at Mons. Even more important was the fact that as the BEF attempted to escape the encirclement, the RFC in concert with the French Air Service, identified the massive wheeling movement and disposition of the German Army. This critical information provided to Sir John French allowed him to make a timely decision to counterattack and thus prevent a severe defeat for the allies in the first month of the war. In a message to the British War Council dated 7 September 1914, he focused on the work of the RFC squadrons:

> I wish particularly to bring to your Lordship's notice the admirable work done by the RFC under Sir David Henderson. Their skill, energy and perseverance have been beyond all praise. They have furnished me with the most complete and accurate information which has been of incalculable value in the conduct of operations. Fired at constantly both by friend and foe, and not hesitating to fly in every kind of weather, they have remained undaunted throughout.[13]

As trench warfare began to dominate in the fall of 1914, it was evident to most, if not all, ground commanders that the airplane had proven itself and would be a great asset to any field commander.

Aircraft development was expanded in all the warring nations of Europe on the outbreak of hostilities. Aircraft designers worked on creating faster and better machines, the men who flew them began to experiment with turning the airplane into a weapon versus just an airborne horse.

The first engagements in the air had the combatants exchanging rifle or pistol fire. A British pilot attempted to mount a machine gun on his aircraft, but his engine could not take the strain of the additional weight. The additional weight of a machine gun to these early, frail aircraft was a major problem. This was solved by early 1915 with the design of more robust aircraft and the development of light machine guns.

The bigger problem in converting a reconnaissance platform into a weapon was how to get a forward firing machine gun to safely fire through the rotating propeller without shooting it off. This issue greatly vexed the three main European antagonists (Britain, France, and Germany) for many months. By early 1915 both the British and the French had developed several types of "pusher" type aircraft where the engine was behind the crew and thus pushed the aircraft though the air. The observer-gunner could sit in front of the pilot with a 180-degree arc of fire unobstructed and had a light machine gun for both offensive and defensive fire.[14]

The Germans on the other hand had built some fairly good "tractor" type aircraft where the engine was in front of the plane and the pilot sat directly behind it. They too could not figure out the dilemma of passing bullets through the propeller safely. They developed several "tractor" aircraft where the pilot, with an observer behind him and armed with a machine gun, could at least provide defensive fire when attacked. With the dilemma of the machine gun firing through the propeller, they chose to take a wait and see attitude. As chance would have it the enemy would provide the key to the solution for them.

Meanwhile the RFC's Number *11* Squadron, received the Vickers FB5 two-seat pusher biplane, nicknamed the Gunbus, and was hastily dispatched to France in February 1915. The Gunbus had some initial success against the German two-seat reconnaissance machines and the British high command was optimistic.[15]

The turning point came in April 1915 when the Frenchman Roland Garros, a pilot and an inventor, developed a solution to the problem of firing through a moving propeller. He mounted wedges of armored steel to the blades of his wooden propeller.

Then he mounted a Hotchkiss machine gun to his Morane Parasol monoplane. The steel wedges successful deflected any bullets that did not pass between the blades. Crude and dangerous, it worked and within several weeks he shot down three German aircraft.[16]

On 19 April 1915, Garros suffered engine failure and landed behind the German lines. He was unable to destroy his aircraft before being taken prisoner. His capture enabled the Germans to solve their problem. The French machine was given to the Dutch engineer and aircraft designer Anthony Fokker, who was designing aircraft for the German Air Service. He was directed to copy the steel wedges. Fokker quickly identified the limitations of the Garros modification. He and his fellow engineers produced a more improved mechanical interrupter gear. By use of a cam that operated in concert with the aircraft engine, it stopped the gun from firing whenever a propeller blade was directly in line with the machine-gun barrel. The Germans solved the problem first, and the air war would significantly get more deadly in the coming months.[17]

This first true interrupter gear was installed on the Fokker EI monoplane. These aircraft were delivered piecemeal (2 to a reconnaissance squadron) in July 1915. By September, the Fokker EIII, was in service. Air combat in the fall of 1915 was still only a minor occupational hazard for allied aircrews. That began to change when the Germans, in an effort to protect their reconnaissance aircraft, and to meet the larger numbers of French and British aircraft flying across the front, formed three small but elite squadrons Kampfeinsitzer Kommandos (KeK).[18] Eack KeK squadron consisted of four Fokker EIII's each. Although not a great aircraft, the Eindecker EIII was faster and more maneuverable than the RFC's Vickers FB5 Gunbus and with a good pilot, the British

aircraft stood little chance of surviving in equal combat. By November 1915, the FB5 was clearly outclassed by the Eindecker.

At first Allied casualties were few in number as the Germans used the Eindecker in a defensive capacity to escort and protect their reconnaissance aircraft. Both sides lacked developed tactics or doctrine for air combat.

Unfortunately for the British, two young and very talented German pilots, *Leutnants* Max Immelmann and Oswald Boelcke, attempted to take advantage of the superiority that the Eindecker gave them over the British aircraft then available on the Western Front.[19] These two keen and experienced airmen developed the first true tactics for air to air combat.

They used the high altitude ceiling of the Fokker Eindecker to fly high above the lines until they spotted enemy aircraft. With the sun behind them, they would dive upon the British or French machine, attacking from the rear, capitalizing on their ability to fire forward through their propeller. The end was almost anticlimactic, unless you were in the British or French machine.

The next advancement in tactics was to hunt in pairs and before long they shared their tactics with more German pilots and began operating in three or four aircraft formations. Unfortunately for the German Air Service they were slow to capitalize on the tactical success that pilots, like Immelmann and Boelcke, were experiencing.

Both French and British losses grew expeditiously and thus began what was to be called the "Fokker Scourge." From July 1915 through March 1916, the Germans controlled the skies over the Western Front at their leisure.[20] In a period of four months, the German Air Service destroyed or forced down sixty-three enemy aircraft against the

loss of sixteen. To fly over German controlled ground was to invite a quick and violent death. They had the better aircraft and until early 1916 they were the only air service that had a synchronized interrupter gear for its forward firing machine guns. Almost fifty British aircrew were killed or wounded in combat during a six-week period from November 1915 to early January 1916, the two worst months of the Fokker Scrouge.[21] Nine German pilots accounted for twenty-eight victories over French or British aircraft. Between the two, Immelmann and Boelcke shot down thirteen of them.

Most of the British casualties occurred conducting long-range reconnaissance or bombing flights deep into German occupied territory. The German pilots, under orders, operated exclusively over their own side of the lines. This was for two reasons: the German Air Service was outnumbered approximately four to one in the air, thus it was deemed wise to let the Allied machines attack them over German controlled territory and also because of the fear that one of their aircraft with its synchronization gear would fall into enemy hands and thus restore the balance of power. [22]

Trenchard faced a crisis and knew he had to alter the tactics that his air service was using or risk his force being driven from the sky. On 14 January 1916, he sent a message to every commanding officer in the RFC in France:

> Until the Royal Flying Corps is in possession of a machine as good as, or better than the German Fokker, it seems that a change in policy and tactics has become necessary. It is hoped very shortly to obtain a machine which will be able to successfully engage the Fokkers at present in use by the Germans. In the meantime it must be laid down as a hard and fast rule that a machine proceeding on reconnaissance must be escorted by at least three other fighting machines. These machines must fly in close formation and a reconnaissance should not be continued if any of the machines becomes detached. This should apply to both short and long reconnaissances. Aeroplanes proceeding on photographic duty east of the line should be similarly escorted. From recent experience it seems that the Germans are now employing their aeroplanes in groups of three or four, and these

> numbers are frequently encountered by our aeroplanes. Flying in formation must be practiced by all pilots.[23]

It was a humiliating admission of inferiority and the change in tactics produced a shrinkage in the strength of the RFC. The number of missions from the army was not reduced, but now at least four aircraft had to be allocated to conduct a mission that previously was done by one. Fighter escorts for corps aircraft caused a sharp decline in air cooperation with the ground forces. Haig understood and agreed with Trenchard's revision of tactics, primarily because during the winter of 1915-16 there was no major ground fighting taking place on the Western Front.[24]

Up until this time in the war there had been little effort given toward formation flying but now much thought and experiment was devoted to solving this problem.[25] Numerous formations were practiced. In the Second Wing the reconnaissance pilot led with an escorting aircraft a further 500 feet above him on each flank and the third aircraft 1,000 feet to his rear. On the morning of 7 February 1916, four British aircraft used this formation to cross the lines with the lead pilot flying at 7,500 feet. Over Roulers, the first German aircraft appeared followed shortly by seven others, which then took up a haphazard formation of their own, falling in behind the British formation. The RFC aircraft completed their reconnaissance and then turned west to return to their own lines. West of Thourout, two more Fokker Eindeckers appeared and proceeded to attack the four British aircraft, one dived on the reconnaissance machine while the other attacked the high escort. Their fire was inaccurate and the British maintained their formation. Then six more German aircraft arrived bringing the total to sixteen following the four British machines. Somewhat surprisingly the Germans did not attack the British formation which crossed the lines and landed safely at their airfield.

There was little doubt to the crews of the British aircraft that it was the formation that had safeguarded them during their fifty-minute flight over the German lines and the rigidity with which the pilots maintained that formation. Had they broken formation and split up they would have been attacked piecemeal and could hardly have survived against the overwhelming odds.[26]

Besides the formation described above, three other formations were experimented with during the winter and spring of 1916 by the RFC. These were the Line Abreast, the Line Astern and Echelon (see Appendix A for detailed description of formation tactics). All three had their advantages and disadvantages. Their success played a pivotal role in defeating the Fokker Scourge and in the development of air combat tactics before and during the Somme battle. These tactics were used in every air war from 1916 to the modern day.[27]

As successful as the German Air Service was with its small squadrons of Fokker Eindeckers, Trenchard firmly believed that the Germans had failed to exploit their enormous technical superiority. Putting himself in his counterpart's place, he would have relentlessly and aggressively attacked the RFC and driven them from the sky until every squadron had been destroyed on the ground or over their airfields.[28]

His new tactics were paying immediate dividends with fewer aircraft and aircrews being lost to the Fokkers and almost as important, his pilots were learning how to fight and survive in the air.

The other good news for the RFC was the fact that newer and better aircraft were at last being sent to the Western Front. Number *20* Squadron was rushed to France and arrived on 23 January. They were equipped with the Royal Aircraft Factory Fighter

Experimental 2b, a two-seat pusher biplane and like most British aircraft was known by its initials and number. Thus the Fighter Experimental was known as the FE2b or "Fee" for short.

Only a few weeks later, the first British aircraft designed as a single seat fighter plane was ready for active service. This was the DH2, a single seat pusher whose designer, Geoffrey De Havilland, had also designed the FE2b. Still without an interrupter gear, De Havilland placed the pilot in a bathtub shaped nacelle forward of the engine with a single Lewis machine gun which could fire forward, provided with a limited amount of traverse and elevation.[29]

Number *24* Squadron, consisting of 12 DH2s, was led by one of most experienced pilot's in the RFC, MAJ Lanoe Hawker, VC. The squadron arrived in France at St. Omer on 7 February 1916. The world's first true fighter squadron designed specifically to defeat the Fokker Eindecker's, had been successfully deployed to the combat zone. Within a month, Number *29* Squadron, also with DH2s, arrived in France along with three other squadrons of FE2bs.[30] Trenchard and the pilots of the RFC eagerly awaited the first air combats between the DH2 and FE2b squadrons and the Fokker Eindeckers.

Would these new aircraft, flying in formation, out-fly and outfight the German fighters that had dominated the skies over the Western Front for the last seven months? The British would have to wait several weeks for the answer. It was days before they realized that the Germans were shifting their fighter aircraft to the south. Many of the Allied leaders failed to see this as a sign that the enemy was preparing for a new offensive. The location: Verdun!

When the firestorm broke at Verdun on 21 February, Trenchard immediately contacted his counterpart in the French Air Service, Commandant Paul-Fernand du Peuty. Without waiting for a call for assistance, Trenchard immediately dispatched every bombsight, every machine gun and every round of ammunition he could spare to the French squadron's in the south. Trenchard knew that du Peuty's air battle over Verdun was his also.[31]

Just as Haig and the BEF assumed 100 additional miles of French sector on the Western Front because of the transfer of French divisions to Verdun, Trenchard's RFC gained an additional 100 miles of air space to patrol as French squadrons were also transferred south to the battle zone. Trenchard immediately requested additional squadrons from England to fill the gap.

Trenchard and du Peuty had formed a strong relationship the year prior. The two constantly discussed, debated and even argued over the best strategy and tactics to employ in the air against the Germans. The French air commander was not convinced by Trenchard's argument that the best way to win the war in the air was to take incessant offensive action against the enemy. British and French aircraft could best be protected by what Trenchard termed as the "strategic offensive". His definition was quite simple: "Attack the enemy over his airfields and his lines and keep them away from your own aircraft that were providing direct support to the army."[32] The French air commander believed that defensive tactics also were a requirement for airmen, just like they were for soldiers on the ground. He respected Trenchard for his calculated recklessness in maintaining offensive operations against the Germans, even when he had inferior aircraft and a shortage of trained aircrew. During the period of the Fokker Scourge de Peuty had

no intention of emulating the tactics of the RFC. At least not until the Allies developed an aircraft that could compete with the Fokker fighters.

Verdun would provide the laboratory for the French and German Air Services where Trenchard's strategy would be tested and proven correct. During the battle of Verdun, the French Air Service took the offensive and within days gained a marked superiority. The Germans had given their few fighter aircraft strict orders to provide close escort to their reconnaissance aircraft and prevent French aircraft from flying into German held territory. It basically became a policy of trying to occupy airspace so that the enemy cannot use it.

The skies above the German Fifth Army were divided into four sectors, each with its own dawn-to-dusk patrols. These "barrage flights" were a major tactical mistake. This tactic was self-defeating, for while the German fighters were flying escort or interceptor missions, they were not attacking French aircraft, airfield, or logistics centers and in doing so assisting the ground commander. At the same time, French fighters and bombers were attacking German infantry positions, airfields and logistics centers at will and practically unopposed.

What saved the German Air Service was that de Peuty's superiors, instead of supporting the French air offensive, brought it to a crashing halt by directing that all French aircraft provide direct support to the French Army around Verdun. The French Air Service went on the defensive and lost the initiative.

Given a respite, the Germans began to organize their fighters into small attack squadrons or Kampfeinsitzer Kommandos (KeK) under the command of Oswald Boelcke. Many of the German fighter aircraft on the Western Front were transferred to

the Verdun sector where the Germans quickly seized the initiative. The roles for both air services had been totally reversed.

As the French tried to occupy the sky with too few aircraft the Germans gained air supremacy. The Germans bombed French formations and interdicted reinforcements prior to reaching Verdun. The more the French Army demanded direct air support, the more the Germans dominated them from the air.[33]

Disobeying the French High Command, du Peuty reissued his original orders to his squadrons. Attack German fighters, reconnaissance and bomber aircraft, attack their airfields, attack logistic centers and troop concentrations. The Germans were forced once again on the defensive as their ground commanders made the same demand for support that their French counterparts had made after being under attack by German aircraft. Within six weeks of the beginning of the Germans offensive against Verdun, the French Air Service had regained air supremacy. By trial and error, du Peuty learned that Trenchard's strategy was correct. Offensive action was the key to air supremacy. He sent a note to Trenchard and followed up with a detailed after-action report. Trenchard regarded it as one of the most significant papers on air warfare produced so far. Its significance makes it worth quoting at length:

> By flying together in threes, our army machines have shown that they can protect themselves, so freeing the real combat aircraft for independent offensive action against enemy fighters which are already organized in such groups. I'd like to draw to General Trenchard's attention also to the following point: in the near future the advantage will go to the group which can carry its striking power the farthest. . . . Aircraft can be divided into two groups: army machines and combat machines. These aircraft can be employed in two separate ways: either by using the combat machines to protect the army machines, or by letting the latter fend for themselves so that the combat machines can do their real jobs of fighting. We employed both methods, and here are the results. Like the Germans, we began by adopting the second method, and thanks to our offensive efforts we attained a

> material and moral superiority so marked that the enemy were forced to protect their army machines. We were proud of this. It made us a little complacent; we yielded to the demands of our own army corps which wanted close protection for their hard-pressed co-operation machines. We in turn were driven to adopt the first method, and were barely able to hold our own with the enemy. The strongest formations of aircraft proved themselves masters of the situation. We then resumed the second method and immediately recaptured local air superiority by going after it. There were two main drawbacks. The first was this: the corps commanders, misunderstanding what was at stake, protested shrilly at being left in the lurch, despite the fact that their corps machines, by flying in formations of three, as ordered, managed to do their work, protect themselves and suffer relatively few casualties in the process. The second drawback has been the acute nervous strain imposed on our combat pilots, who are carrying the fight non-stop to then enemy's back areas, fighting and dropping their bombs far from their own bases and within constant range of the German anti-aircraft defences. Our losses in the air may be heavy, but they are much less than those we are inflicting on the enemy. And our air mastery is proving of enormous advantage to the troops on the ground.[34]

Trenchard was vindicated. From pilot, to wing commander to Commander of the RFC, he had formulated that to gain air supremacy, one would eventually have to fight for the sky; the fact that the Germans had the better aircraft with a synchronized machine gun did not deter him. He told both his superiors and his subordinates that there could be no "standing on the defensive" in the skies. Survival in three-dimensional warfare depended on maintaining the offensive, whatever the odds or the cost. In Trenchard's mind it was a choice between destroying the enemy or being destroyed by him.[35]

That being said not everyone believed that Trenchard was correct. In late January 1916 there was much criticism in Parliament that directly concerned the RFC and its commander. Two critical issues were raised and debated. Why were the Zeppelin raids on the United Kingdom not being intercepted by the air service? And why was the Royal Flying Corps suffering such heavy casualties over the Western Front? Trenchard's leadership and tactics were criticized. Trenchard ignored them knowing he had the support of his commander in chief, Field Marshal Haig.

When Prime Minister Asquith wrote Haig expressing his concern about the RFC, Haig replied, defending Trenchard, his leadership and tactics. Haig agreed with Trenchard that "the sky was a battlefield where orderly retreat was impossible, standing on the defensive unthinkable. Unlike the land or the sea this new three dimensional area was one and indivisible, with no fixed lines to hold or flanks to turn."[36]

Trenchard also realized that the human factor was the key to achieving air supremacy and was just as important, if not more so, than technological advancements in weapons and aircraft. The morale, welfare, and stamina of his crews he knew would be the difference between winning or losing the coming battle for air supremacy over the Somme.

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[1]Malcolm Brown, *The Imperial War Museum Book of The Western Front* (London: Motorbooks International Publishers and Wholesalers, 1994), 83.

[2]Denis Winter, *Haig's Command* (London: Viking, 1991), 56.

[3]Martin Middlebrook, *The First Day on the Somme* (New York: W. W. Norton and Company, Inc., 1972), 68.

[4]Ibid.

[5]Ibid., 41.

[6]A. H. Farrar-Hockley, *The Somme* (London: Severn House Publishers, 1964), 49.

[7]Andrew Boyle, *Trenchard* (New York: W.W. Norton and Company, Inc., 1962), 184.

[8]Peter Hart, *Somme Success* (Barnsley, South Yorkshire, UK: Pen and Sword Books Limited, 2001), 20.

[9]H. A. Jones, *The War in the Air*, vol. 2 (London: Hamish Hamilton, 1969), 111.

[10]Boyle, 186-188. In analyzing Trenchard's definition of Air Supremacy it is evident that it parallels Royal Navy doctrine at the turn of the century, both in idea and terminology. Command of the sea was roughly defined as keeping the seas clear for your own purposes and denying them to the enemy for his use. Trenchard applied this concept

to air warfare. It was his intent to send RFC aircraft over and into German controlled territory to dominate the air space, and prevent the Germans from doing the same to the British. He was in fact practicing what the Royal Navy had done over the world's oceans for the last 100 years. It was only later in the war that the combatants began to define the tenets of airpower doctrine. The architects of airpower (Douhet, Trenchard, Mitchell, et al) would later develop the terms such as air superiority, air interdiction and close air support that exist today. An argument can be made that what Trenchard identified as air supremacy was in fact air superiority.

[11]Hart, 20-21.

[12]Denis Winter, *The First of the Few* (Athens, Georgia: University of Athens Press, 1983), 11.

[13]Ralph Barker, *The Royal Flying Corps in France: From Mons to the Somme* (London: Constable and Company, Ltd., 1994), 47.

[14]Christopher Shores, Norman Franks, and Russell Guest, *Above the Trenches* (London: Grub Street, 1990), 11.

[15]Ibid., 12.

[16]Ezra Bowen, *Knights of the Air* (Alexandria, VA: Time-Life Books, 1980), 56.

[17]Ibid.

[18]Shores, Franks and Guest, 13.

[19]Hart, 17-18.

[20]Norman Franks, *Sharks Among Minnows* (London: Grub Street, 2001), 10.

[21]Boyle, 162.

[22]David C. Cooke, *Sky Battle, 1914-1918* (New York: W.W. Norton and Company, Inc., 1970), 90-91.

[23]Jones, 156-157.

[24]Boyle, 156.

[25]Jones, 156-157.

[26]Ibid., 158-159.

[27]J. E. Johnson, *Full Circle* (New York: Bantam Books, In., 1980), 27.

[28]Boyle, 162.

[29]Shores, Franks, and Guest, 13.

[30]Ibid.

[31]Boyle, 168.

[32]Ibid., 154-155.

[33]Barker, 147.

[34]Boyle, 170.

[35]Ibid., 156.

[36]Ibid., 163-164.

CHAPTER 2

THE BRITISH GAIN AIR SUPREMACY OVER THE SOMME: APRIL-JUNE 1916

Trenchard's tenants for winning air supremacy were based on gaining and maintaining the offensive. His stated purpose for waging air warfare was "to win freedom of movement for the reconnaissance, photographic, bombing, and artillery aeroplanes in their essential tasks of helping the army overcome their enemy, and to deny similar freedom to the opposing air service."[1] In analyzing how the RFC planned to gain air supremacy prior to the Somme offensive, it is necessary to understand how it was organized to support the BEF on the Western Front in 1916.

When the RFC was first established in 1912 it consisted of a naval wing, a military wing (army) and the Central Flying School. The naval wing became the Royal Naval Air Service (RNAS) and the air arm of the Royal Navy. In 1914, the RNAS had the mission to protect the shores of the United Kingdom while the military wing i.e. the RFC, deployed to France to support the British Army. Over the next eighteen months General Henderson, the RFC's first commander, followed by General Trenchard, built and organized the RFC into an efficient fighting service whose sole purpose was to assist the BEF in winning the ground war in France.

In January 1916, as both the BEF and the RFC continued to grow ever larger, the military leadership made the decision to further decentralize the organization of the RFC in France. The air needs of the army were divided into two main areas. The first was artillery cooperation, aerial photography, and tactical reconnaissance on the immediate front of each army corps. Second, was air combat against the German Air Service, distant

reconnaissance, and bombing for each army. Each army, of which the BEF had four in January 1916, was allotted two wings grouped as a brigade, one of which was identified as a corps wing for corps and divisional missions, on the basis of one squadron per corps; and the other identified as an army wing, of two or more squadrons, for operations required by the army commander. Each brigade was also allocated its own aircraft park/depot and a kite balloon squadron. This brigade formation came into effect on 30 January 1916.[2]

The RFC was tasked to provide squadrons to support Lieutenant General Henry Rawlinson's Fourth Army when it was formed in March 1916. On 1 March the 3rd Wing was detached from III Brigade for this purpose and the 12th (Army) Wing was reconstituted as a corps wing. The 3rd Wing provided air support to Rawlinson's army for four weeks until 1 April 1916 when the IV Brigade was stood up. The 3rd Wing became the corps wing of that brigade, which was completed by the 14th (Army) Wing and by the addition of Number 1 Kite balloon Squadron. The commander of the IV Brigade was Brigadier General E. B. Ashmore[3] (see RFC Order of Battle in Appendix B).

Since the Royal Flying Corps re-organized its squadrons into formations based on their missions to provide support to the British Army, it is essential to identify in detail what those missions were. In all there were six missions assigned to the RFC. They were: (1) aerial reconnaissance, (2) aerial photography, (3) observation and directing artillery, (4) bombing, (5) contact patrols, and (6) air combat with the German Air Service.

With the outbreak of war in France the RFC's first mission was that of aerial reconnaissance for the ground commander. After several notable successes in August and September 1914 at the 1st Battle of the Marne, where their reports were both timely and

accurate, army commanders requested the RFC be increased with as many aircraft as necessary to provide them both visual and photographic reconnaissance. Over the course of the next year, RFC Headquarters established techniques and procedures whereby squadrons were directly attached to corps headquarters to provide aerial intelligence to the ground commander.

Once the war of movement ended in late 1914 and trench warfare took hold on the Western Front, the RFC received its third mission that was nested with the first two: artillery observation and direction. With the enemy occupying fixed lines of defense it was critical that accurate fires be placed on German infantry and artillery units if any future attack was to be successful.

So important had aerial reconnaissance, photography, and artillery observation and direction become that new tactics had to be developed for their integration into the ground campaign. These tactics were first tested by the RFC during the Battle for Neuve Chapelle in March 1915.

During the planning for the battle, the British Army requested that the RFC photograph the area of operations around Neuve Chapelle to create accurate maps for the operation. The RFC, using newly developed cameras and French aerial photography techniques, was able to accomplish this mission practically unmolested by the German Air Service. The photographs provided detailed information on the location of many of the German fortified positions and also confirmed the location of many enemy artillery batteries in the area to be attacked.

During the Battle of Neuve Chapelle the RFC also perfected the third mission assigned to it by the army: artillery observation and direction. During the fighting on the

Aisne River in the fall of 1914, the British had experimented with using aircraft to direct artillery fire. At first artillery officers were brought aloft and served as the observer while the pilot flew the aircraft. Because of this mission, officers of the two branches formed a close and fraternal link that lasted for the remainder of the war. A large percentage of future RFC pilots and observers would come from this regiment.

Using lighter wireless sets than those available in 1915, an aerial observer could observe and direct British artillery fire onto German strong points and artillery positions with great accuracy. The techniques and procedures for directing artillery and communicating the call for fire to the friendly artillery battery became known as the "clock code." The aerial observer placed the target at the center of a celluloid disc on his map with sectors and ranges marked on it.[4] Improvements in the wireless equipment carried by the artillery spotting aircraft then made it possible for the observer to report to the British artillery with both speed and accuracy.

During the Battle of Neuve Chapelle the RFC also assigned aircraft to conduct patrols over the German lines to report the movement of reinforcements into the battle zone. Furthermore, the RFC assigned select aircraft the mission of bombing rail junctions where troop concentrations and logistic centers were usually located. Although the bombings had minimal impact on the enemy, the RFC created what would become another viable and long-term mission for itself.

Finally, in its efforts to keep the ground commander informed of where its forward troops were during the conduct of the attack, the RFC conducted "contact patrols." The intent was for aircraft to fly low enough over the battlefield to be able to spot the locations of the most forward advancing troops and then inform the ground

commander. The ground commander could then assess the progress, or lack thereof, and make better informed decisions. At the same time British artillery fire could be called for and directed to support any units that had been stopped by an enemy fortified position that had escaped the preliminary bombardment.[5]

The RFC played a key role in supporting the British breakthrough at Neuve Chapelle. However, the lack of sufficient reserves, capable of exploiting the initial success, ensured that the British success on the ground was short lived. Although not nearly as successful as it could have been, Neuve Chapelle was of critical importance, not only to the British Army, but to all the combatants in the First World War, as it was the first time that airpower was fully integrated with ground forces in combat.

The leadership of the BEF determined that the contact patrol had been a major success and should be incorporated into future operations. Two months later at the Battle of Aubers Ridge, British troops were issued with strips of cloth and directed to lay them out in front of their forward positions. Aircraft flying overhead at 5,000 feet could report the positions back to corps headquarters via wireless. Once again the British made little territorial gains during this battle, but both the ground and air commanders believed the use of contact patrols had been very successful.[6] It was because of the increasing effectiveness of the RFC in these roles that generated the development of tactics for air-to-air combat in late 1915 and early 1916.

Once Trenchard directed that brigades be formed within the RFC in early 1916, squadrons were allocated which were best able to protect themselves, to the army wings. Air combat was becoming more and more specialized. Drawing on the lessons learned from the French Air Service at Verdun, Trenchard made the decision that these wings

should be allocated all fighter aircraft within the RFC in France. In late April Trenchard met with his brigade commanders and explained to them that it was his intent to remove all fighter aircraft from the corps squadrons and place them in squadrons assigned to the army wings. Although not fully completed by the opening of the Somme offensive, it proved to be so effective that this reorganization of assets and units within the RFC became permanent for the remainder of the war.[7] As winter turned to spring and new fighter squadrons arrived from England, the corps squadrons focused on accomplishing the missions of reconnaissance, photography, artillery observation, and bombing key targets in the German rear area opposite the British Fourth Army.

Of the six missions given to the RFC prior to the beginning of the Somme offensive, the one that garnered the most attention from the Fourth Army commander, Lieutenant General Rawlinson, was artillery observation and direction. At a conference in mid-April 1916, he stated, "Much more practice is still required with aircraft and artillery. There has been improvement, but not yet enough."[8] A pamphlet issued by the British general staff in January 1916 addressed the importance of cooperation between the RFC and the artillery. It stated that artillery programs had to be planned by the artillery commander of the counterbattery group in consultation with the squadron commander whose squadron was supporting him. Air observers were to discuss, plan, and rehearse every aspect of each day's mission with the battery commander and then conduct an after action review upon returning from each aerial mission.

During the winter and spring of 1916, the artillery and the RFC developed a thorough and professional efficiency, and a rapport that would serve them well in the coming battle. There were shortcomings identified, primarily due to the fact that the

expansion of the RFC had not kept pace with that of the increase in artillery. A major issue was communications. A drawback to wireless communications was that it could be jammed by the enemy or by overlapping messages sent out from other nearby aircraft. This limited the number of aircraft that could work with artillery units along any given length of the front.

The solution to both enemy and friendly jamming was to reduce the number of wireless messages to a minimum and by the invention of what was to be called the "clapper-break." The British found that by varying the pitch or tone of the signal sent by the aerial observer, a ground operator could distinguish one aircraft from another working on the same wavelength, The wireless set used by the RFC normally gave off a high note. Once fitted with the clapper-break the set could be tuned to give off either a low or medium note. Two flights of each corps squadron were quickly equipped with clapper-breaks, one with low note, the other medium. The third flight operated its wireless in normal mode without the new device. It was also found that the low note had longer range so that flight was assigned long-range work while the high note squadron was assigned to contact patrols. The significance of this device was instrumental in enabling the RFC to double the number of artillery observation aircraft over a given sector. In April, the Third Wing (whose personnel developed the clapper-break) proved that one wireless aircraft could cover nearly 2,000 yards of trench line without fear of causing interference to another aircraft's communication set.

Another major step forward was the improvement of the clock code for transmitting the call for fire from the aircraft to the firing battery. It was hoped by the senior British leadership that the Somme offensive would create a breakthrough of the

German lines and lead to open warfare. If this did occur the artillery batteries would be moved forward where they would have to fire on new and unknown targets versus the static enemy trenches and artillery positions they had been engaging for months prior to the battle. There would be little time for coordination between the batteries and the corps squadrons if a war of movement took place. A renowned squadron commander, Major E. R. Ludlow-Hewitt from Number *3* Squadron, had been working on modifying the "clock code" since November 1915. By June 1916, his modifications were in place throughout the RFC.[9]

The Zone Call for Fire was based on the lettered squares of a 1/40,000 scale map. Each square was divided into four zones, lettered, for example A, B, C, and D. Each zone, covered an area of 3,000 yards square, had a two-letter identifier made up of the map square letter, followed by the zone letter. The aircraft observer sent his request for fire by using the particular zone in which the target was located. The artillery battery would only respond to those calls for fire in which their guns could fire into.

The group artillery commander had a choice, depending on the mission or size of the target, to allow his subordinate batteries to fire upon receipt of a call for fire into their zone or he could retain control, giving instructions directly to battery commanders once he received the call from the aerial observer. The strength of the Zone Call for Fire was it ensured at any given point in time every sector of the battlefield was covered by supporting artillery units. Air observers, without knowing the locations of the batteries, could submit a request for fire and then provide the corrections. It reduced the requirement for liaison between RFC crews and artillerymen to the minimum and eliminated any confusion which could arise due to problems of communications while the

ground forces were on the move. Although the Somme would not bring about the war of movement the British hoped for, the Zone Call for Fire would be used throughout the five month campaign with much success.

Both Rawlinson and Trenchard agreed that the use of contact patrols would be an important task for the RFC once the battle began. Assisting the ground commander of unit status and locations amidst the fog and friction of the modern battlefield would be a great help. During April and May 1916 the Fourth Army and the RFC conducted many training exercises together, rehearsing for the upcoming offensive. On 26 May, Rawlinson's headquarters published instructions for contact patrols, which stated that aircraft bearing distinctive markings (broad black bands painted underneath the lower wing and blue streamers attached to the wing struts) were to have the sole duty of tactical observation of the battlefield, reporting directly to army corps headquarters. The infantry were to indicate their progress by lighting flares as directed by the company commander or as far down the chain of command as the section commander. Certain infantry units would also have small mirrors or small triangular tin sheets tied onto soldiers packs, the flashes it was hoped would allow an air observer to follow the advance but this system would work only if the sun were out!

Aircraft would also receive messages from battalion and brigade headquarters via lamps or other ground signals. The air observer, besides transmitting information signaled from ground units, was also to keep corps headquarters informed of enemy movements during the preliminary bombardment, the progress of the attack once it began, the movement of enemy reserves and the staging of counterattacks.[10]

A code was also established between the RFC and all ground headquarters using signal panels. There were several available. The first consisted of large Louvre shutters of six to eight laths painted white on one side and neutral on the other. The laths were connected by tapes and the ground operator could work his tapes so as to expose the white side of the laths to spell out a message using Morse code. In training it was found that a message could be read up to a height of five to six thousand feet. Another consisted of a simple canvas sheet staked to the ground with a series of colored panels painted dark green on one side or white on the other allowing the sender to send messages using Morse code. Under actual combat conditions the infantry put themselves at great risk to use this marking system and the dust and smoke caused by artillery fire often times obscured the panels from the searching airmen.

In training and in combat, balloon observers could spot a moving column of infantry or artillery up to 12,000 yards away. Flares could be seen out to 7,000 yards. Because of this Rawlinson requested three kite balloon sections be attached to his army to support his attack.

A distinct mission for the RFC that would prove of great benefit to Rawlinson and his army, both before and during the upcoming battle, was that of bombing. In November and December 1915, 3 Wing, RFC had conducted several bombing operations against German logistic and rail centers in the Somme area with surprising success. After Trenchard's edict to conduct formation flying, RFC squadrons began to concentrate all available aircraft of the wing to bomb a single target. This was a major change over previous raids where a squadron would attack multiple objectives by assigning two or three aircraft to each target. Now mass bombing of a single target became doctrine.

Trenchard believed that if the objective was not more than thirty miles behind enemy lines, the bombers would be adequately protected by fighters flying patrols between the bombers and enemy airfields. His subordinate commanders believed that the bombers, minus the observer, could carry additional bombs and did not require escorts. If the objective was more than thirty miles away, two out of every ten bombers would carry an observer with two Lewis machine guns instead of a bomb load to provide protection for the bombers. By the middle of March 1916 squadrons assigned bombing missions increased from fourteen aircraft to thirty-one (twenty three bombers and eight escorts).[11]

A month prior to this, Haig had given Trenchard permission to conduct night bombing operations against targets not more than six miles behind the German lines. Because of the inherent dangers with flying and navigating at night, Trenchard placed a constraint on his squadrons. He directed that until all crews were trained in night operations, no more than two aircraft per night from each army wing could conduct night bombing missions. The RFC had had some success with night flying before the war and had flown limited night missions in 1915. However, night flying had never been a priority. But now, the Germans were conducting night operations and Trenchard wanted to ensure that the RFC was at least as proficient, if not more so, than the enemy in this task. Limited night bombing operations were carried out prior to the start of the Somme offensive but because of generally poor weather and the shortage of trained pilots, Trenchard husbanded his resources on accomplishing his missions that supported the BEF.

While the corps squadrons focused on carrying out their aerial reconnaissance, photography, artillery observation and direction, and bombing missions, the army wing

squadrons began the deadly struggle for air supremacy as Trenchard had ordered. Only by accomplishing this difficult task would the RFC be able to complete its other missions, and in doing so assist the Fourth Army in its upcoming offensive.

As previously mentioned, the RFC had been receiving new aircraft, organized into fighter squadrons, since late January 1916. On 23 January, Number *20* Squadron, the first to be fully equipped with the FE2b, had arrived in France. Number *24* Squadron (DH2s) arrived in France on 7 February, followed by Number *25* Squadron (FE2bs) on 20 February. Number *29* Squadron (DH2s) and Number *23* Squadron (FE2bs) arrived in early March. To these squadrons would fall the task of engaging the German Air Service Fokker Eindeckers and ending the Fokker Scrouge.

There was little air-to-air combat in February and March in the Fourth Army sector due to the fact that the Germans had repositioned most of their fighter aircraft south in the Verdun area. This gave the pilots and observers of the new RFC fighter squadrons, time to train with their new aircraft, to practice formation flying, and also to get familiar with their area of operations.

When the FE2b and the DH2 had been designed, the British did not have an interrupter gear that allowed a machine gun to fire through a forward mounted propeller. Thus, they followed the conventional design of pusher aircraft: a nacelle which accommodated the pilot (or in the case of the FE2b a pilot and observer-gunner), instrument panel, weapons and a rear mounted engine. The FE2b had a 120 horsepower Beardmore engine while the DH2 had a 100-horsepower Monosoupape rotary engine, with the tailplane and rudder carried by converging booms from the top and bottom mainplanes on both aircraft. The armament for the DH2 was a single .303 Lewis machine

gun while the FE2b had three Lewis machine guns for the observer to use in either a sitting or standing position. Once in combat these two aircraft would bring to an end the superiority of the Fokker Eindecker over the Western Front.

Leading the RFC's efforts to gain air supremacy was Number *24* Squadron. The commanding officer was Major Lanoe G. Hawker, winner of Britain's highest award for gallantry in combat, the Victoria Cross. He had received this honor for single handedly shooting down three German aircraft in one day on 25 July 1915. He was the first RFC fighter pilot to win this award in the First World War and prior to the Somme offensive was one of the most experienced combat leaders in the RFC.

While the German Air Service focused on Verdun, Hawker spent days and weeks training his pilots in tactics and formation flying. Trenchard had directed that due to their combat leadership and experience, squadron commanders were not allowed to take part in contact patrols or operational flights against the German Air Service. Constrained by this restriction Hawker did not often lead his men into combat but, unlike many in his position, he flew regularly, usually allowing his flight commanders to lead while he flew as just another pilot in the formation.

He found that commanding a fighter squadron was rewarding despite the numerous challenges of administration and personnel problems that confronted him on a daily basis. He also understood that the orders he received from wing headquarters which directed he provide escorts for deep reconnaissance designated urgent despite terrible weather were the result of insistent and sometimes unreasonable demands from the army which Trenchard would never disapprove.

Hawker had many strengths: he was an operational pilot, an excellent trainer, a tactician, and an innovator (among the many things he developed were thigh high fur boots for DH2 pilots who easily suffered near frostbite from the intense cold in their open cockpits). He originated the de-briefing sessions that were now standard procedure in the RFC after every flight. He was popular and well known throughout the RFC and had become the model for every British fighter pilot.[12]

On 2 April 1916, Number *24* Squadron achieved its first of many decisive victories under Hawker before and during the Battle of the Somme. Lieutenants Tidmarsh and Sibley shot down an Albatros two-seater but it was not until 25 April this squadron had their first combats with the dreaded Fokker Eindecker. While escorting five BE2cs from Number *13* Squadron on a reconnaissance mission, four DH2s attacked a single Eindecker 10,000 feet over German held Bapaume. The Eindecker dove away and avoided combat. Rejoining the BE2cs, the British fighters were attacked by three newly arrived Eindeckers. In his DH2 Lieutenant S. E. Cowan was set upon by two German fighters. He outmaneuvered one of the Fokkers by flying in an upward spiral. He then found himself below a second Fokker. He elevated his Lewis gun and fired more than 24 rounds into the German aircraft. Cowan easily climbed upwards and got on the tail of the enemy machine, emptying the remainder of his drum of ammunition and loading a fresh one. His DH2 was being badly bumped around in the Fokker's slipstream and he found it difficult to aim and fire properly. The German pilot was desperately trying to shake his pursuer off his tail. The German banked vertically, sideslipped, then dove 500 feet before flattening out and headed east as fast as he could fly. Cowan did not know that he, a relative new pilot to air combat and the Western Front had just bested in aerial combat

the infamous Leutnant Max Immelmann, then the top-scoring Fokker pilot with fourteen victories.[13]

While Cowan's air-to-air combat was taking place the crews of the BE2cs were able to conduct a detailed reconnaissance unmolested and discovered that the Germans were building a third-line trench system opposite the Fourth Army's sector. They also reported that many of the towns and villages in that same sector were being fortified. Reporting back with this information, several other aircraft were tasked to immediately photograph this entire new trench system.

This action, one of many that occurred during April and May 1916, demonstrated without a doubt, to both the British and the Germans, that the Fokker Eindecker was no match for the agile DH2. The FE2b also fought many air-to-air combats during this period, and it more than held its own against the best the German Air Service could put in the air. One German fighter pilot had this to say about the FE2b:

> The techniques and tactics of the English were amazing, their main principle being that each machine could not look after itself but its partner. Each one therefore protected the other against any attack by their German opponents, and each pair tried to attack the same foeman. . . . The Englishmen refused to be rushed and their steadiness gave them an absolute superiority. Meanwhile our machines tried to break their formation by a series of advances and retreats, like dogs attacking a hedgehog. They pirouetted and spiraled, but their movements exposed them to more risks than their opponents, who appeared to be invulnerable and unassailable.[14]

More importantly, by the end of April, Trenchard's tactics produced visible results. From 1 February to 30 April, the RFC had shot down or destroyed forty-two German aircraft for the loss of thirty-two.[15] This was considered a good ratio by the British, but does illustrate that the war in the air, like that on the ground, had become a war of attrition.

Also of great importance to the RFC was the fact that in April a new two-seater tractor biplane arrived in France. This was the Sopwith 1 and 1/2 Strutter. Initially armed with the standard Lewis machine gun for the observer, it had performed so well during its initially testing that it was chosen to be the first British aircraft to be equipped with the newly developed interrupter gear, which allowed a nose mounted Vickers machine gun to fire through the propeller.[16]

Trenchard was not pleased when told that these aircraft would be assigned to the RNAS Number *70* Squadron in May. He notified Haig of this misuse of a valuable asset, especially with the offensive drawing nearer. Haig, notified the government and his argument did not fall on deaf ears. Trenchard was told he would receive two flights of eight Sopwiths from Number *70* Squadron to be attached to the RFC in mid-June with more to follow. Little did Trenchard know that the "more to follow" would not arrive until 27 October. This was just another result of the interservice rivalry between the RFC and the Royal Navy, where two separate air services were competing for pilots, observers, and other critical resources such as aircraft and engines.

More good news for the RFC came in the way of sheer numbers. From 1915 onwards squadrons had been organized and equipped with twelve aircraft. Trenchard's plea had finally been acknowledged and in April 1916, all squadrons on the Western Front received an additional six aircraft to increase their operational strength to eighteen, with the squadrons supporting Fourth Army getting first priority.

While this was taking place the French fielded the Nieuport 11, an outstanding V strut, tractor sesquiplane (biplane with the upper wingspan greater than the lower). It was small in size and very fast (ten miles an hour faster than any RFC aircraft at the time) and

had an excellent rate of climb (10,000 feet in 10 ½ minutes). It was armed with a Lewis gun on its top wing, which fired over the propeller arc. The Nieuport 11 had great success against the Germans over Verdun and because of this the RFC immediately purchased six of these fighters. By the end of summer, three RFC squadrons would be equipped with Nieuport 11's and the even better Nieuport 17.[17]

Tempered with this good news, Trenchard was still very much concerned about the lack of trained aircrews. The RFC on the Western Front received on average ten pilots a week which barely replaced even a low number of casualties, and worse was the fact that most of these replacements had only the minimum allowable fifeteen hours of flight time upon reaching their squadrons.[18]

Air combat between Number *24* Squadron and several squadrons of German fighter and observation planes became much more numerous as the spring weather improved, especially in May. Lieutenant Cowan shot down an Albatros two-seater on 4 May. During this same air combat his thumb switch jammed, stopping the engine and forcing him to land behind the German lines. Fortunately the impact of landing corrected the malfunction and he was able to take off before being captured by German infantry.[19] On 20 May two DH2s piloted by Lieutenants Tidmarsh and Wilson of Number *24* Squadron joined in the attack by Captain Summers of Number *22* Squadron against a lone Albatros two-seater. Lieutenant Tidmarsh was credited with destroying the enemy aircraft after it crashed in flames. During this same patrol, Lieutenant Wilson shot down another German aircraft, which crashed in flames into the British lines south of Maricourt.

From mid-May to the beginning of the Somme offensive there was a significant decrease in German air activity against the RFC, all along the British sector of the Western Front. On 23 May Sir Henry Rawlinson, the commander of the Fourth Army, sent a note to his commander in chief, Field Marshal Sir Douglas Haig with great news:

> It was about the first week of May that we sent out our reconnaissance over Bapaume escorted by the de Havillland machines. Up to that time we had been carefully training our young pilots and it was not till then that Ashmore thought them sufficiently expert to take on the Fokkers. In carrying out the reconnaissances they were attacked by the Fokkers and rendered a good account of themselves for they reported that on the first occasion they sent two Fokkers to earth in a damaged condition and on the second they destroyed another which fell in the town of Bapaume and was smashed against some houses. All three of these machines fell of course in the enemy's lines so we have no certain information of what actually happened to them. But the fact remains that since this occurrence we have successfully photographed the whole of the enemy's trenches in front of the Fourth Army, the first line, over a front of more than twenty miles without being once attacked by the Fokkers. This was done on the 15th, 16th, 17th, and 18th May and clearly shows that for the moment at any rate we have command of the air by day on the Fourth Army front. I cannot speak too highly of the work of these young pilots, most of whom have recently come out from England, and the de Havilland machine has unquestionably proved itself superior to the Fokker in speed, maneuver, climbing, and general fighting efficiency.[20]

After nine months the Fokker Scrouge was officially over. Under Trenchard's direction and leadership, the RFC had gained the initiative in the air on the Western Front and would not relinquish it for the remainder of the war.

During the last two weeks of June 1916 the tempo of the air war over the Somme increased in preparation for the start of the offensive. RFC fighter and reconnaissance squadrons became engaged in daily combats as they flew over German held territory. In trying to accomplish its missions to support the British Army and maintain its offensive strategy, the RFC had suffered severe losses that were higher than those it imposed on the German Air Service. From 1 January to 1 June 1916, the RFC lost on average one aircraft

and its pilot or crew every day. March and June were the costliest, where casualties rose to forty per month.[21]

For the RFC, air supremacy over the Somme was truly realized on 18 June 1916. On that day the German Air Service lost its premier fighter pilot, Leutnant Max Immelman, "the Eagle of Lille," credited with 15 victories in the air. At approximately 2100 hours, on the last patrol of the day, seven FE2bs from Number *25* Squadron were attacked by Immelman and four other Germans, who were all flying Fokker EIII's. Immelman shot down one of the FE2bs, but was in turn attacked by a FE2b piloted by Second Lieutenant G. R. McCubbin and observer Corporal J. H. Waller. Waller opened fire once the German aircraft came into range as Immelmann flew past the nose of the British aircraft. Seconds later the Fokker staggered and went into a dive where it was seen to break up in the air. Immelmann fell from nearly 5,000 feet and was killed, but there has been much controversy over how one of the war's first great pilot's and tactician's was killed.[22]

The RFC gave credit to McCubbin and Waller for the aerial engagement, both were decorated and Waller was promoted to sergeant. The Germans believed that since Immelmann's aircraft broke up in the air he had either been hit by antiaircraft fire or that his synchronization gear had malfunctioned and he had shot his propeller off. Either way, Immelmann was dead.

For the RFC and the German Air Service, Immelmann's death had major ramifications. He had been one of the most widely renowned fighter pilots of the war, highly respected by his own air service and the RFC. Immelmann, along with Boelcke,

was one of the most successful Fokker pilots during the Fokker Scourge, prompting the complaint from the RFC that their aircraft were nothing but "Fokker Fodder."

For the British, aircrew morale soared to its highest point of the war so far.[23] In the months leading up to the ground offensive they had been equipped with several good aircraft that were more than a match for what their enemy could put in the air. They had been on the offensive for three months and, by all accounts, had seized air supremacy over the Somme, and in concert with the French Air Service, had seized it above most, if not all, of the Western Front.

The German Air Service on the other hand had lost one of its best tactical leader's. Morale dropped as German aircrew realized they were flying and fighting a defensive battle, the RFC had the initiative and for the time being had the better aircraft. To make matters worse, Immelmann's contemporary, the recently promoted Hauptmann Oswald Boelcke, was transferred from front line operations. Immelmann's loss had been quite damaging to German morale so the German High Command made the decision to transfer Boelcke away from the front just as the air war was intensifying over the Somme. They did not want to risk the life of Immelmann's partner, who had also become a national icon throughout the German Empire.[24] Just when Boelcke's leadership was needed most, he was ordered to the Balkans to conduct an inspection tour of air operations in that theater.

The main objective for Rawlinson's Fourth Army on the first day of the battle was to capture the German front line and be in position to attack and capture the German second line of trenches from Serre in the north to Montauban in the south (see figure 2). In late February the Fourth Army had occupied positions from Gommecourt in the north

to Curlu in the south. Trenchard had created the 4th Brigade under Brigadier General E. B. Ashmore on 1 April to provide air support to Rawlinson's army. It comprised the 3rd (Corps) Wing which consisted of Number *3* Squadron (Morane Parasol's), Number *4* Squadron (BE2cs), Number *9* Squadron (BE2cs), and Number *15* Squadron (BE2cs). Number *1* Kite Balloon Squadron with two sections was also assigned to 3rd (Corps) Wing. The 14th (Army) Wing had two fighter squadrons; Number *22* with FE2bs and Number *24* with DH2s. In addition to the squadrons of 4th Brigade, 9th Headquarters Wing, which consisted of three additional squadrons: Numbers *21* (RE7s), *27* (Martinsyde G100s), and *60* (Morane Scouts) were tasked to support Fourth Army by conducting strategic reconnaissance for Rawlinson's headquarters, the bombing of communication and supply lines, and general offensive operations against the German Air Service.[25] Thus, by the beginning of the offensive, the Fourth Army was supported by nine squadrons totaling 167 aircraft. The overall strength of the RFC by 1 July had increased to twenty-seven squadrons, consisting of 421 aircraft and four kite balloon squadrons.[26] The negative effect on the RFC however was the fact that it had suffered unheralded casualties leading up to the start of the offensive. By 1 July, ninety-eight aircraft were written off as unserviceable due to accidents, or battle damage, including twenty-five that were shot down by the enemy.

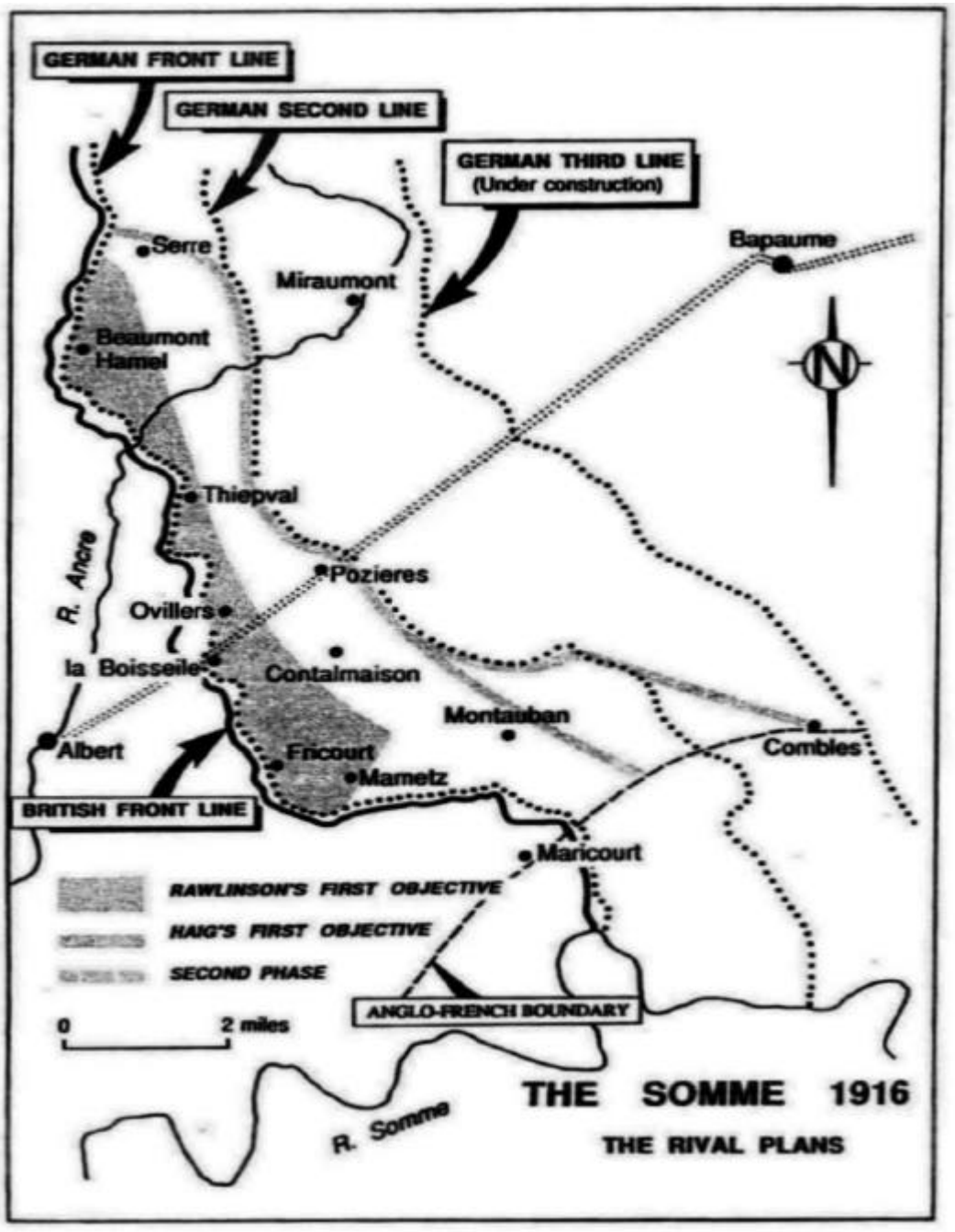

Figure 2. The Somme, 1916: The Rival Plans

Source: Robin Prior and Trevor Wilson, *Command on the Western Front* (Oxford: Blackwell Publishers, 1992), 142.

Opposing Rawlinson's Fourth Army on the Somme was the German Second Army, commanded by General Fritz von Below. Von Below had six divisions in the front line, with an additional four and a half in reserve. The Second Army was supported by air units which consisted of six reconnaissance flights (*Feldflieger-Abteilungen*) totaling forty-two aircraft, four artillery flights (*Artllerie-flieger-Abteilungen*) with seventeen aircraft, a fighter-bomber squadron (*Kampfgeschwader Number 1*) with forty-three aircraft, a fighter bomber flight (*Kampfstaffel Number 32*) with eight aircraft and one single-seater fighter detachment (*Kampfeinsitzer Kommando*) of nineteen aircraft. The total air strength of the German Second Army, not counting those at depot level, was 129 aircraft.[27] The German Air Service supporting von Below's army were thus outnumbered by British and French aircraft four to one. This was largely because the Germans had committed most of the aircraft to the intense air campaign being waged over Verdun.

It was also very evident to both Rawlinson and von Below that not only did the RFC outnumber the German Air Service in aircraft, but that the British also had the technical advantage in fighter aircraft with the DH2, FE2b and the Nieuport 11. Because of this, German aircraft were forced away from the main battle area and enabled RFC Corps squadrons to complete their missions unmolested by enemy fighters as the offensive loomed ever nearer.[28]

From the middle of June the British began an intermittent artillery bombardment of the German Second Army positions along the Somme. On Friday, 23 June, a major thunderstorm swept over the front, and the kite balloons of Numbers *1* and *14* Sections

were hit by lightning and destroyed while at least another three balloons were badly damaged.

The next day, 24 June, the British began what became one of most intense artillery bombardments of the war on von Below's Second Army. Intermittent rain and low cloud hindered the RFC's artillery observation and direction, causing pilots to fly low and into the paths of their own artillery shells. The RFC was only able to direct artillery fire onto forty targets, far below what the artillery plan called for.[29]

On the twenty-fifth of June the RFC made a concerted daylight attack against the German observation balloons all along the Somme front, with the main effort going against those balloons opposite Rawlinson's Fourth Army. Fifteen balloons of the twenty-three in the air found themselves under attack by RFC fighters. Five were destroyed. This success in spite of the poor weather and intense antiaircraft fire was followed up the next day when three pilots from Number *1* Squadron, flying Nieuport 11s, shot down three more balloons, which had survived the previous day's attacks.

On this same day, the second day of the British artillery bombardment, the German artillery began an intense counter-battery program. The RFC was able to locate and identify one hundred and two positions. Aircraft and balloon observers reported back that the entire Somme valley "seemed alive as blazing dumps and exploding ammunition over a wide area added to the inferno."[30] The German Air Service was again noticeably absent in trying to prevent the RFC from accomplishing its missions. One Fokker Eindecker was seen near the lines over Courcelette, but was immediately attacked by a DH2 from Number 24 Squadron and quickly shot down.

For the next four days poor weather and heavy fog made the work of the RFC more difficult in supporting Rawlinson's army. Every hour of bad weather that kept the British aircrews on the ground and away from the front, brought respite to a German artillery battery, unit assembly area or logistics center. No one understood this better than Trenchard and the RFC.

British crews took many risks in their flimsy wood and fabric machines, flying below the low clouds to direct artillery onto the German guns. The bad weather took its toll however and for this reason the effectiveness of the British artillery preparation was not nearly as effective as it could have been. On 28 June the daily communiqué for the RFC recorded: "Heavy rain and low clouds throughout the day. In the evening it cleared somewhat, and some successful artillery work was accomplished. There was no hostile aircraft activity."[31]

Both Haig and General Ferdinand Foch, the French Northern Group Army commander had agreed that the offensive would begin on 29 June. Foch requested a two-day delay to ensure that his assault forces were in position. Bad weather also set in and it was agreed to postpone the attack until 1 July. Because of this postponement, the artillery bombardment was extended from five days to seven.

The RFC in conducting its reconnaissance and photography missions during the artillery bombardment, focused on the impact the British artillery was having on the barbed wire the Germans had in front of their trenches. The wire was an obstacle that Rawlinson and his subordinate commanders were keenly aware of. Destruction of the enemy wire obstacles in front of their defensive positions was one of the most important missions assigned to the artillery to accomplish before the Fourth Army attacked. These

defensive positions had been constructed to comprise several trench systems, which were interconnected and protected by barbed-wire entanglements. These obstacles ran the length of the entire trench and were often forty yards in depth.

With the artillery assigned the mission of eliminating these obstacle belts, the RFC was tasked to observe and report the effects of the barrage on the wire. Thousands of photographs were taken during the final week before the start of the offensive. One of Rawlinson's corps commanders reported: "The aeroplane photographs showed admirably the effect of the bombardment both on the wire and on the trenches and were of the greatest value."[32]

Unfortunately for the one-half million British soldiers of the Fourth Army waiting for the attack to begin, the wire was not cut or destroyed universally across the width and depth of the German defensive positions.

As night arrived on 30 June all was in readiness for the attack to begin the next morning. Among the RFC squadrons, fitters, riggers, and armorers made the final adjustments and preparations to the fighters, bombers, and reconnaissance aircraft. The aircraft and their crews would be aloft well before the British infantry left their trenches.

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[1]Andrew Boyle, *Trenchard* (New York: W.W. Norton and Company, Inc., 1962), 172.

[2]Air Historical Branch, *The Royal Air Force in the Great War* (London: Imperial War Museum, 1996), 111.

[3]Ibid., 112-113.

[4]Dominick Pisano, *Legend, Memory and the Great War in the Air* (Seattle: University of Washington Press, 1992), 56-57. The "clock code" was simple and almost impossible to misinterpret. The aerial observer, using a map, placed the target at the center of the celluloid circle. Twelve o'clock represented true north from the target, three o'clock was due east, six o'clock due south and nine o'clock due west. If a shot landed

due south of the target, the observer relayed that it had landed at six o'clock. Imaginary circles were drawn around the target to represent ranges of 10, 25, 50, 100, 200, 300, 400 and 500 yards. These ranges were identified by code letters: Y, Z, A, B, C, D, E, and F respectively. The observer tapped C3 using Morse code on his wireless set to tell the artillery battery that the shot had landed 200 yards east of the target.

[5]Chris Chant, *The Pictorial History of Air Warfare* (London: Octopus Books Limited, 1979), 19.

[6]Ibid., 20.

[7]H. A. Jones, *The War in the Air*, vol. 2 (London: Hamish Hamilton, 1969), 167-168. In April 1915, Sir David Henderson, then commanding the RFC, believed that fighter aircraft should be concentrated into fighter squadrons, but his subordinate Wing Commanders disagreed. They believed that each Corps squadron should have several fighter aircraft assigned to them for their use. Henderson consented to the views of his subordinates.

[8]Ibid, 174.

[9]Ibid., 175.

[10]Air Historical Branch, 116-118.

[11]Jones, 182.

[12]Ralph Barker, *The Royal Flying Corps in France: From Mons to the Somme* (London: Constable and Company Limited, 1994), 148.

[13]Alex Revell, *British Fighter Units, Western Front, 1914-1916* (London: Osprey Publishing, 1978), 13-14.

[14]Peter Hart, *Somme Success* (London: Leo Cooper, 2001), 48.

[15]Terry C Treadwell and Alan C. Wood, *The First Air War: A Pictorial History, 1914-1919* (London: Brassey's, 1996), 62.

[16]Norman Franks, *Bloody April…Black September* (London: Grub Street, 1995), 14. The first British aircraft to reach the RFC, fitted with a synchronizing gear, was the Bristol Scout which arrived in France on 25 March 1916. On 8 April the RFC finally captured a Fokker Eindecker with its interrupter gear intact, when the machine made a forced landing behind the British lines. It was a little too late, for by then the British had solved the riddle of firing through a propeller safely.

[17]Barker, 147.

[18]John H. Morrow Jr., *The Great War in the Air: Military Aviation from 1909 to 1921* (Washington DC: Smithsonian Institute Press, 1993), 167.

[19]Revell, 13-14.

[20]Jones, 161.

[21]Boyle, 180-181.

[22]Norman Franks, *Sharks Among Minnows* (London: Grub Street, 2001), 99-101. The German obituary notice in the 24 June edition of the *Frankfurter Zeitung* read: On 18th June, 1916, there met his death for his country in aerial combat Max Immelmann, Knight of the Order "pour le Merite" and Commander 2d Class of Royal Saxon Military Order, Knight Commander of several high and of several of the highest decorations, holder of the Iron Cross, I and II Class. Royal Saxon 1st Lieutenant and fighting pilot of a Flying unit. His glory and his name are his country's. In the annals of the German Flying Corps his memory will live as that of a bold flyer, fighter and conqueror.

[23]Barker, 153.

[24]Franks, 107.

[25]Revell, 22.

[26]Ibid.

[27]Jones, 201.

[28]Revell, 22.

[29]Jones, 207.

[30]Ibid., 208.

[31]Christopher Cole, *Royal Flying Corps, 1915-1916* (London: William Kimber and Company, Ltd., 1969), 168.

[32]Jones, 207.

CHAPTER 3

THE BATTLE OF THE SOMME: JULY-AUGUST 1916 (PHASE I & II)

"Attack Everything"

MAJ Lanoe Hawker, VC, DSO

At 0730, Saturday, 1 July 1916, there was a momentary lull as the bombardment ceased. The skies had cleared and it looked to be a perfect summer day. Silence filled the air as the British artillery batteries reloaded their howitzers and cannons and prepared to fire on their secondary objectives. Platoon commanders blew their whistles all along the Fourth Army front and the first wave of British infantry from fifteen divisions left their trenches and proceeded out into no-man's land. The Somme offensive had at last begun.

The aircrews of the RFC had been aloft since 0400. As the sun rose and the early morning mist faded away, aerial observers were able to report to the ground units the effect of the bombardment. As the first waves of infantry left their trenches, contact patrols flew between 500 and 1,000 feet overhead, reporting back to each corps and division headquarters on the progress of their units.

Aerial observers, most of them flying in the outdated BE2c, flew along the entire front of the Fourth Army, searching out and locating dozens of German artillery batteries who were now laying down an intense barrage of their own on the advancing British infantry.

The airmen sent hundreds of requests for fire and loitered in the air to direct the counterfire against the enemy artillery units, but with hundreds of bursting shells landing seemingly everywhere below them, it became impossible to give more than general corrections.

Balloon observers from Number *1* Kite Balloon Squadron were linked by telephone directly to each of the corps artillery headquarters. Not only did they observe and direct counterfire, they also reported the effects of the German barrage.[1]

Besides observing and directing artillery, the RFC also focused on its other missions to support Rawlinson's army. Air reconnaissance during the early morning hours of 1 July revealed that there was very little movement on the roads and at the rail centers behind the German lines. The RFC gave special focus to the rail centers at Bapaume and Cambrai. Reports were sent back to Fourth Army headquarters that there was no major activity taking place at either station. With this information in hand, Rawlinson was heartened by the fact that the Germans were not moving reinforcements into the area that his army was about to attack.[2]

The RFC had been conducting bombing raids on key German installations and sites throughout May and June, but with the start of the offensive Trenchard stepped up the intensity of these operations. Under his direction, the RFC Headquarters staff planned an intense bombing campaign, which began on 30 June.

The first target was the St. Sauveur train station, which was attacked by six RE7s from Number *21* Squadron on 30 June. The raid was repeated by the same squadron at 0600 on 1 July with some success. Bombs were plainly seen striking the station buildings and the rail lines. For each raid six RE 7s were escorted by two Martinsydes and by two Morane biplanes.

The RFC also attacked the Cambrai train station in the afternoon and the lines were struck by at least seven 112-pound bombs. Returning that evening for a second strike, Second Lieutenant A. L. Gordon-Kidd bombed an approaching train from 900

feet, scoring a direct hit on the middle of the train, which caught fire and began to explode. An hour later the train was still burning.[3]

At 1400, six aircraft from a III Brigade squadron, attacked the rail center at St. Quentin. The entire flight of six aircraft was attacked deep behind the German lines. Three were shot down, their crews killed or captured. The bombing of this rail center had been extremely costly for the British and with little gain, or so they thought.

What the RFC did not know was that the six bombing aircraft had hit an ammunition dump next to the rail center. Forming up near the dump was the German 22d Reserve Division, which was being rushed to the front. Two infantry battalions were in the process of loading a train when the British aircraft arrived overhead. Lined up in the station sidings were more than two hundred ammunition wagons carrying most of the division's artillery and small arms ammunition. Before they could be moved, the fire spread from wagon to wagon. At least sixty exploded in a series of blasts that were heard miles away. The fire also destroyed the troop train and all of the equipment of two battalions.[4]

The Germans suffered more than 180 killed or wounded in the attack. The 71st Reserve Regiment, which had most of the casualties, was sent back to the rear area to be re-equipped. It would be more than a month before the British learned how effective this bombing raid had truly been. Several captured German soldiers from the 22d Reserve Division, relayed how the division's arrival to the front had been delayed by several days because of a few British aircraft. The RFC had thus prevented one more German division from reaching the front lines in a timely manner to oppose the attack of the Fourth Army.

The first offensive patrols by the RFC occurred when Number *32* Squadron took to the air at 0545. Number *24* Squadron was also airborne shortly thereafter. The squadron commander, Major Lanoe Hawker, VC, DSO, had issued his tactical orders to the seventeen others pilots the day before the start of the offensive. Two words that summed up his personality and the ethos of the RFC: "Attack Everything."[5] The pilots of these two RFC squadrons witnessed one of the largest attacks undertaken by a modern army. Patrols would continue throughout the day, the last leaving the front line area only after it became too dark to see.

The most noticeable air engagement on 1 July however took place before the infantry left their trenches. At approximately 0600, two DH2s from Number *32* Squadron intercepted ten German bombers crossing the lines at Festubert. Flying the lead DH2 was the squadron commander, Major Lionel Rees, who had won the Military Cross as a flight commander in 1915 flying an FB5 Gunbus with Number *11* Squadron. With Rees in the other DH2, was his wingman, a Canadian, Lieutenant John Simpson.

Simpson and Rees became separated and against 10-to-1 odds, Simpson attacked the German formation. Within seconds three enemy aircraft attacked him in turn. After a fierce exchange of machine-gun fire, Simpson's DH2 descended more than 5,000 feet, apparently under control. In fact Simpson was dead, having been hit eight times in the head by the accurate fire from one of the German gunners.

Rees did not witness the attack but spotted the German formation and was surprised that a flight of enemy machines was actually attempting to cross over the lines into British airspace. Something they had not done in any strength for weeks. Because of

this, he at first thought they were British aircraft until he recognized the black crosses on their fuselage and wings.

Rees, replicating Simpson, attacked without hesitation. Holding his fire until within 100 yards, he quickly disabled two German aircraft, both were seen to be trailing smoke and descending back towards the German lines. To the surprise of Rees and the thousands of British and German soldiers who observed the fight from the ground, the German aircraft turned back towards their lines. At least one of the bombers dropped its bombs onto German positions.

Rees gave chase and the faster DH2 soon overtook the German bombers. He was, however, hit in the leg from one of the bomber's observer-gunners firing at long range. Rees continued his attack and began to fire as he came within range of the German lead aircraft. "I finished firing about ten yards away, and saw the observer sitting back firing straight up in the air. . . . He was firing an immense amount of ammunition. Just before he reached the lines I gave him one more drum. Having finished my ammunition I came home."[6]

One British pilot had single handedly prevented ten German bombers from crossing the British lines and accomplishing their mission. He was also credited with shooting down two of the enemy machines. Thousands of soldiers from both sides were eyewitnesses to this act of incredible bravery.

As it turned out Rees had killed the observer of the lead aircraft, Leutnant Zimmermann, who in fact was in command and leading the bombing mission. Rees' actions had a major impact on the German Air Service and on its conduct of bombing raids during the opening phase of the battle. As H. A. Jones, the author of *The War in the*

Air, volume 2, stated: "The efficacy of his attack impressed the enemy whose attempts at daylight raiding afterwards were few".[7]

Lieutenant Gwilym Lewis, a pilot in Number *32* Squadron, wrote a letter to his parents describing the action:

> The Major (Rees) happened to be up at the same time on a DH. I told you he was the bravest man in the world. He came across them a little later, and the Archie (Anti-Aircraft) batteries say they have never seen anything so gallant or comic in their lives. The Huns were in a tight little bunch when he came along-after he had finished they were all scattered in twos and ones all over the sky, not knowing which way to go. He sent the first one down out of control; the second one probably had a bullet through his engine. He turned to attack the third, whose observer was sitting with his head back and his gun aiming vertically upwards fairly blazing off bullets. I suppose he must have forgotten to take his hand off the trigger before he "pipped out". Just as the Major was going to get this machine as a trophy another fellow came and shot him in the leg from below. He was still going on but he discovered he couldn't steer his machine, so he came home.[8]

Rees was wounded worse than it first appeared. He spent six months in the hospital recovering from his wounds and would never fly on operations again. His actions in leading his fighter squadron in June culminated with his one and only mission on the first day of the offensive. The one fight had far reaching effects. For the British Army and the Germans, it symbolized that the RFC owned the skies above the Somme. For his courage and resolution in the face of overwhelming odds, Rees was awarded the Victoria Cross. Although the air battle over the Somme would last five months, Rees was the only RFC pilot to earn Britain's most distinguished medal for valor.[9]

RFC pilots were probably the first to realize that events of the ground were not going as planned. As they watched the masses of British infantry moving across no-man's land from the west, they also observed the German infantry scrambling from their deep dugouts, and proceed to lay down a barrage of machine-gun fire that swept through the British ranks. Almost all British units that did penetrate the German lines were

quickly cut off, and it proved impossible to launch reinforcements to come to their aid. The German artillery fire was also causing many casualties in no-man's land, which also obscured the British airmen from accurately observing British artillery they were directed along the German lines. They watched in frustration as the German units formed up and counter-attacked all along the Fourth Army front. Contact patrols supporting Fourth Army units, reported this information to several Corps headquarters via messages dropped from the air or by wireless. The information was accurate but due to confusing reports that Rawlinson and his staff were receiving from subordinate unit headquarters, by the time decisions were made and orders were issued, it was too late to influence the action that had been observed and reported by RFC aircrews.[10] By the end of the day the Germans were able to recapture most of what Rawlinson's army had gained on the first day of the attack.

The left of the main attack, from Serre to as far north as Thiepval where VIII and X Corps attacked, ended with similar results. These two formations were supported by Number *15* and *4* Squadron's, respectively. Forward ground observers were able to track the progress of the fighting but only the RFC observers were able to observe the isolated deep penetrations made at Pendant Redoubt and at the Schwaben Redoubt. Number *4* Squadron reported that several German artillery batteries between Gandcourt and Coucelette were conducting hasty displacements to ensure they were not overrun by the advancing British infantry.[11]

Number *4* Squadron reported at 1630 that the enemy was not massing any troops on this part of the front but the British units within the Schwaben Redoubt needed reinforcements to maintain their foothold within the German lines. Captain C. A. A. Hiatt

of Number *4* Squadron was directed to fly over the fierce fighting that was taking place at Thiepval, where the Germans had fortified this French village. The penetrations that had been made into the German trenches in this village and along this part of the line could not be reinforced due to several German counterattacks that had regained much of the ground the British had captured. Based on this information, X Corps headquarters directed that the British infantry attacking Thiepval and Beaumont Hamel withdraw.[12]

The greatest advance for the British on 1 July was observed by Number *9* Squadron flying over XIII Corps on the British right flank. A contact observer reported that the 30th Division had broken into the German front line and faced little opposition. He also witnessed the 18th Division occupy Pommiers Trench and then capture Pommiers Redoubt.

Another *9* Squadron aircraft observed a line of flashes, which reflected from the mirrors on the packs of the advancing British soldiers, in the direction of Montauban. The British crew, Captain J. T. P. Whittaker and Second Lieutenant T. E. G. Scaife, spotted a German artillery battery coming into action in Bernafay Wood. The RFC crew dove down to 700 feet and dispersed the battery with machine-gun fire. They then attacked German troops occupying trenches east of the woods with machine gun fire before breaking off the attack to observe the 16th Manchesters enter and capture Montauban.[13] Rawlinson received this good news within the hour from the RFC aircraft and his RFC liaison officer.

On the right of the British front the French had been much more successful in their attack on both sides of the Somme. Haig made the decision to concentrate his efforts between La Boisselle and the boundary with the French. He notified Rawlinson that he

would no longer be responsible for the sector from La Boisselle to Serre. That area was being turned over to Lieutenant General Sir Hubert Gough, who would take command of the two northern corps of the Fourth Army.[14]

When darkness set in over the Somme, the RFC aircraft returned to their airfield for well-earned rest. Many of the aircrew from the nine squadrons providing support to Rawlinson's army, had been in the air between six and twelve hours. This would be the norm for the duration of the first phase of the battle.

Darkness also brought an end to the sporadic fighting along the Fourth Army front (see figure 3). It also brought an end to one of the most horrific days of slaughter the British Army has ever experienced. It would be several days before the official casualty report was completed. It was only when the massive amounts of wounded had overwhelmed the medical system, that had been set up prior to the commencement of the battle, that both army and civilian leaders realized how badly the British Army had suffered on 1 July. An advance of one mile on a three-mile front had cost 57,470 casualties: 19,240 were killed or died of wounds; 35,493 were wounded; 2,152 were missing; and 585 had been taken prisoner.[15]

The next day, 2 July, RFC reconnaissance aircraft detected German troop trains bringing reinforcements from Douai towards the Somme front and this was reported to Rawlinson. While this air reconnaissance was taking place, Number *21* Squadron dispatched several flights of aircraft to bomb an infantry division headquarters and multiple ammunition dumps. Each aircraft carried six bombs with each bomb weighing 336 pounds apiece. The bombing mission was successful in that several ammunition dumps were engulfed in flames, the fires lasting well into the night. The RE 7 bombers

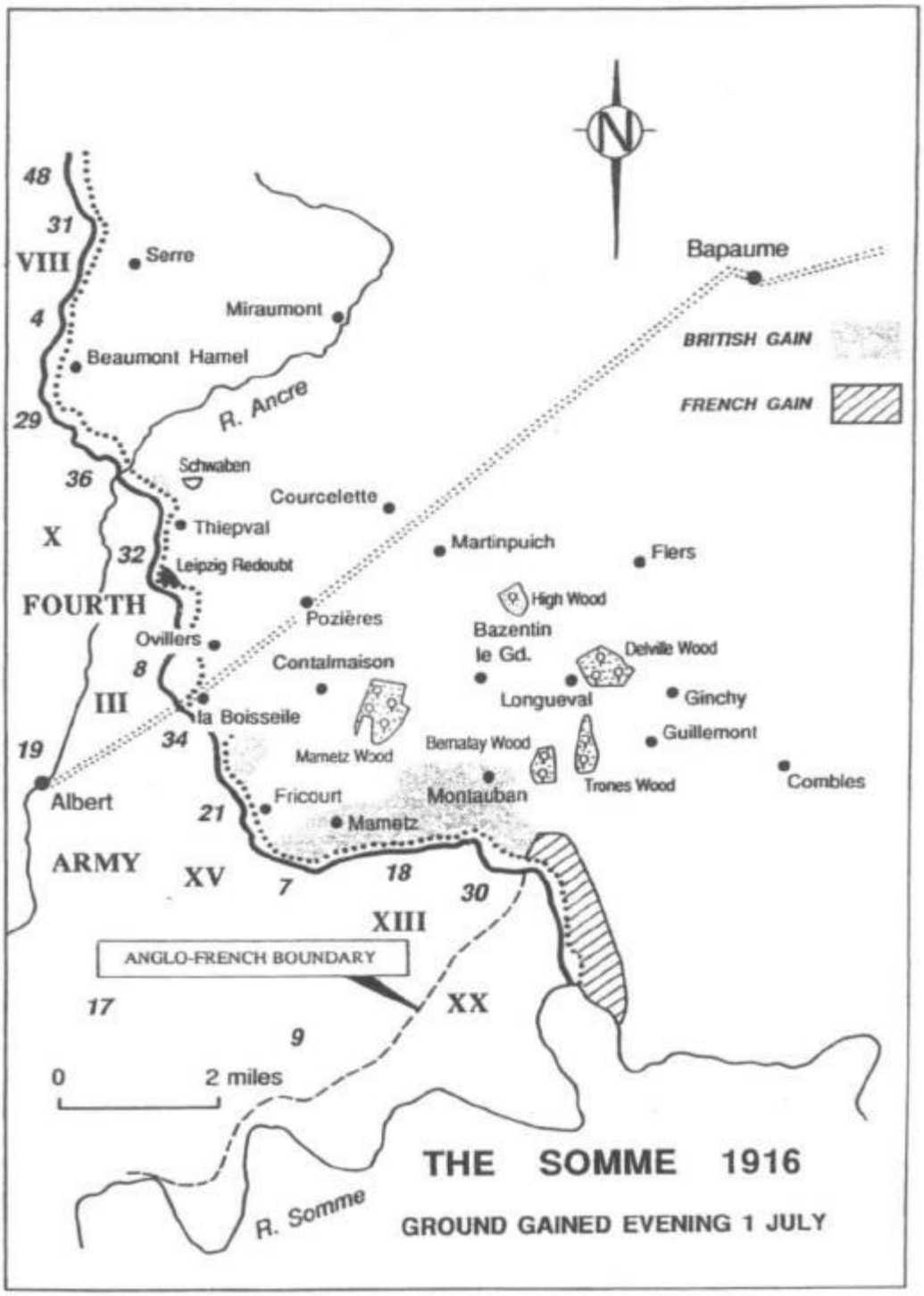

Figure 3. The Somme, 1916: Ground gained evening 1 July

Source: Robin Prior and Trevor Wilson, *Command on the Western Front* (Oxford: Blackwell Publishers, 1992), 178.

were escorted by four Martinsydes from Number *27* Squadron while six Moranes of Number *60* Squadron flew over the Bapaume area while the attack was taking place. Not surprisingly, no German aircraft rose to the challenge and there was no interference from the enemy while the British bombers made their bombing runs.[16]

On the Fourth Army front that day there were only four air combats. In the Third Army sector, there were seven, resulting in four German aircraft being shot down. To Trenchard, these were sure signs that the RFC had gained supremacy of the sky over the Somme battlefield.

On 3 July, as Rawlinson's army continued to attack the German fortified villages of Thiepval and Ovillers, RFC observers flew over Cambrai and reported back to both RFC headquarters and the Fourth Army commander that there were many troop trains in the town. The Germans were rushing reinforcements from the east and south-east and were moving them forward to Bapaume and Peronne. Within twenty-four hours, several of the units were identified and it was confirmed that they had been hastily transferred from the Verdun sector.

If the much sought after breakthrough that Haig so desperately wanted had not occurred in the first seventy two hours of the offensive, he could at least take some satisfaction in the fact that the enemy was removing units away from the battle in the south. He was thus achieving one of his missions, which was to relieve the pressure on the French at Verdun.

Trenchard directed that his bombing squadrons attack the enemy troop trains and interdict them before they could deliver the reinforcements into the Somme battle. Over the course of the next three days numerous missions were directed against these trains

staging at Cambrai. RFC casualties were heavy, with eight bombers shot down and many more badly damaged and with wounded crews. These missions reaffirmed to all the bombing squadron commanders, that sending antiquated BE2cs deep into German held territory, flying without escort and without their observers (because of the weight of the bomb-load), was as good as signing a death warrant for the crew.

As Trenchard's biographer, Andrew Boyle wrote: "a less resolute commander might have cancelled his bombing programme. Trenchard decided instead to revert immediately to escorted attacks in big formations, realizing as he did that there would be fewer machines for reconnaissance and that more fighters would be needed."[17]

At the end of the first week of the battle of the Somme, Trenchard sent a note back to Brigadier General Sefton Brancker, a trusted colleague and the Director of Air Organization in England:

> I have lost, as you know, eight machines at low bombing, I am afraid that some of the pilots are getting a bit rattled, and it's not popular. I have put in for two V.C.s. The fighting is going well, and the pilots are doing splendidly. We have crashed a good number of Fokkers and brought down a good many more than they admit. We have done 12 hours flying a day which makes you think a bit, as a lot of pilots have to do five or six hours day after day…It's a bit of a strain with so many hostile machines and anti-aircraft guns about…The depots are getting overworked mending machines that are shot to pieces and crash, issuing stores and repairing transport.[18]

During the first week of the offensive the RFC fought continuously above the ground battle, only the occasional bad weather brought them limited periods of respite. By 9 July there was a noticeable increase in German air activity along the entire Fourth Army front. Twenty-four air combats took place and several German aircraft penetrated as deep as ten miles into the British rear areas.

It was becoming more and more apparent to Haig and Trenchard that when the Germans transferred infantry divisions from Verdun to the Somme front, they were also transferring fighter squadrons to provide support to these ground forces. Trenchard was not surprised by the increase in enemy air activity, he expected it. His offensive policy was proving to be an effective measure to maintain air supremacy, though the costs in crews and aircraft was becoming more expensive with each passing day. The Germans were definitely on the defensive over the Somme battlefield and the RFC was forcing them to require more squadrons for defensive patrolling. Trenchard knew that if the German Air Service continued to conduct defensive patrolling, they would not wrest air supremacy from the RFC.

When the first phase of the Somme offensive ended on 14 July, the British had gained six thousand yards at great cost. The Fourth Army had pushed forward and gained possession of the southern crest of the main plateau between Delville Wood and Bazentin-le-Petit. The effect the RFC played in supporting the Fourth Army was significant. Cooperation between the RFC and the infantry via contact patrols, had provided results which made it clear to both ground and air commanders that this mission would be a requirement for all future operations. Feedback from aircrew confirmed that most information could be obtained by direct observation from a low height and if in doubt the pilot would fly low enough to draw fire, which usually verified friend from foe.

What was somewhat unexpected to the RFC was the comparative immunity of the aircraft conducting the contact patrols. Trenchard had directed his squadrons to take extreme risks to ensure the infantry were supported from the air. During the first phase of the battle the only British aircraft casualty that occurred while conducting a contact patrol

was shot down by British artillery engaged in the prepatory bombardment. That only one was lost from friendly fire was remarkable since almost all RFC crews flying between 500 and 1,000 feet during the last week of June reported numerous occasions when British artillery shells passed visibly by their aircraft during the conduct of their missions.

The artillery direction and observation by the RFC, hampered during the last few days of June by bad weather, was conducted as well as it could have been given the conditions and the enormity of the mission. There were several occasions during the first two weeks of the offensive where bad weather prevented aircraft from observing counter battery missions. Several ground commanders commented that the lack of air observation made all the difference in whether attacks succeeded or failed. After a failed attack on Pozieres, the III Corps commander, Lieutenant General W. P. Pulteney stated: "aeroplane observation now appears to be an essential preliminary to a successful attack."[19] He was not alone in his beliefs.

Lieutenant General Sir T. L. N. Morland, commander of the X Corps, forwarded notes to Rawlinson and Trenchard that provided examples in his sector of numerous successful attacks, due largely to the RFC-artillery cooperation. At Bailiff Wood, RFC directed artillery fire destroyed fourteen emplacements. Another thirteen artillery pieces were abandoned by their crews due to the accuracy of the fire. At Contalmaison Wood, several artillery batteries had been destroyed. The same results were found at Mametz, Caterpillar Woods and Bottom Wood. Morland added that the success reinforced the continuation of air observation linked directly to corps and divisional artillery headquarters.[20] The division artillery commander for the 32d Division stated that: "The

German artillery on our front has been in a great measure destroyed by our aeroplane observation for heavy artillery."[21]

On 9 July Trenchard had written Haig stating that his policy was intent on keeping the German Air Service from interfering with the corps squadrons conducting reconnaissance and artillery observation and direction missions. Even Trenchard could not have envisioned just how successful the RFC would be during the first two weeks of the campaign. Not once during this period was a corps squadron aircraft prevented from conducting its mission by an enemy machine. As Trenchard realized it was impossible to occupy the air so that no enemy aircraft could break through, the offensive patrols by the army squadrons into the German rear areas contained the German Air Services to the point that they could not or did not provide the required support to their own ground forces.

At the conclusion of the first phase of the Somme offensive (1-14 July), Trenchard and his staff conducted an assessment as to how successful the air service had been in assisting the Fourth Army. They found that in conducting their direct support missions before the start of the offensive, the RFC had photographed the entire battle space that Rawlinson's army would fight on and they had reported on the condition of many of the barbed wire obstacles, enemy trenches, and on the probable strength of the German units in the Somme sector. They had been successful in keeping the corps and division headquarters informed of the location and status of their units during the initial and subsequent attacks, doing their best to prevent a ground attack from failing due to a commander's lack of situational awareness.[22] At the same time and as equally important, there were several incidents where RFC crews prevented the British artillery from firing

on British troops as the advancing units moved quicker than the artillery timetable had planned.

Also in the direct support role, RFC aircraft conducted low level bombing and strafing attacks on German artillery and infantry units with much success. The ground commanders were also especially pleased with the aerial observation and direction of artillery, both before and during the first phase of the battle which neutralized the fire of many German artillery batteries, and destroyed trenches and strong points that were holding up the infantry advance.

At the same time, the army squadrons sought out and engaged the German fighters and bombers with an almost incredible intensity. They prevented the German Air Service from providing aerial observation to his artillery batteries, direct support to his defending infantry and also preventing bombers from interdicting the advancing British infantry. On no occasion did a German aircraft attack the Fourth Army rear area where huge logistic centers had been established to support the offensive.

There were also the intangible effects on troop morale, both British and German, in which the RFC had a great impact because of its domination over the Somme during this phase. H. A. Jones states in the *War in the Air, v*olume 2:

> The morale of the British infantry before they went into the line suffered nothing from aircraft bombing. Moreover when the infantry moved up to attack they could do so in the knowledge that no spying aeroplanes would turn the German guns on to them; and they could go into battle reasonably assured that any rapid enemy movements to counter them would not go unnoticed by their own airmen.[23]

Numerous battalion and brigade officers within Fourth Army reported similar comments to their division and corps commanders who then informed Rawlinson and Haig of the positive impact the RFC was having on soldier morale.[24]

The commander of the German Second Army also had high praise for the RFC. General Fritz von Below was fully cognizant that the RFC had supremacy of the skies over the Somme through the spring and summer of 1916. No finer tribute to a force can be paid than that from the opposing commander:

> The beginning and the first weeks of the Somme battle were marked by a complete inferiority of our own air forces. The enemy's aeroplanes enjoyed complete freedom in carrying out distant reconnaissances. With the aid of aeroplane observation, the hostile artillery neutralized our guns and was able to range with the most extreme accuracy on the trenches occupied by our infantry; the required data for this were provided by undisturbed trench reconnaissance and photography. By means of bombing and machine-gun attacks from a low height against infantry, battery positions and marching columns, the enemy's aircraft inspired our troops with a feeling of defencelessness against the enemy's mastery of the air. On the other hand, our own aeroplane's only succeeded in quite exceptional cases in breaking through the hostile patrol barrage and carrying out distance reconnaissances; our artillery machines were driven off whenever they attempted to carry out registration for their own batteries. Photographic reconnaissance could not fulfill their demands made upon it. Thus at decisive moments, the infantry frequently lacked the support of the German artillery either in counter-battery work or in barrage on the enemy's infantry massing for attack.[25]

The German commander was not alone in his praise for the RFC. His soldiers, many of whom felt the direct effects of the RFC's presence over the battlefield, reported, "The English are always flying over our lines directing artillery shoots thereby getting all their shells right into our trenches. Our artillery can only shoot by the map as they have no observation. This moral defeat has had a bad effect on us all." The same German soldier also added a comment about the German Air Service: "One must be too ashamed to write, it is simply scandalous. They fly as far as this village but no further, whereas the English are always flying over our lines."[26]

It was very evident that the RFC was having a direct impact on the German units opposite the British Fourth Army. Relief of frontline units had to take place at night or

during extremely bad weather. Any attempt to conduct these operations in daylight would bring down a barrage of artillery fire, directed and observed by RFC aircraft. Reinforcements, food, water, and most importantly ammunition, had to be brought from the rear area to the frontlines during hours of darkness for the same reason.

As successful as the RFC was in the opening phase of the battle, it was evident to Trenchard and most of the BEF's leaders, that the most the RFC could contribute would still remain a small part of the whole. Attaining air supremacy would not make the difference between victory or defeat on the ground.

The second phase of the battle lasted almost two months, from 15 July to 14 September. The Fourth Army continued its battle of attrition, with the fiercest fighting taking place on the British right flank. A sharp salient had formed there at Delville Wood and Longueval (see figure 3) which allowed the Germans to concentrate observed fire on the wood and the village. Rawlinson directed that this salient be eliminated but bad weather postponed the attack and allowed the Germans to prepare new defensive positions. Another delay was caused by a German counter-attack against the village of Longueval on the 18th and 19th of July. To assist the forces fighting in Longueval, several British and South African brigades attacked High Wood. RFC observers from Number 3 Squadron flew constant contact patrols and reported that all but the northern portion of High Wood had been captured by nightfall.

During the several days of bad weather the Germans had constructed a series of new trenches near Le Sars and Courcelette which were identified by crews from Number *4* Squadron. Number *3* Squadron identified a major new trench system between Le

Transloy and Warlencourt and major improvements to the third line between Eaucourt l'Abbaye and Flers.

The RFC also reported that the village of Flers was strongly held by the enemy but more importantly discovered a new trench system had been built 300 yards forward of the Switch line, the main objective for III Corps in the coming attack. The RFC crew landed and immediately reported to the III Corps commander what they had seen. Based on their first hand knowledge, the corps commander amended his plan of attack and made this new trench the first objective for the 19th Division instead of the Switch line.

On 23 July, after a forty-eight hour bombardment along the whole front from Trones Wood to Pozieres, British troops began their attack at 0130. The Germans had reinforced their front lines and again used their machine guns to good effect. The advance of the Fourth Army was repulsed except for the foothold achieved at Pozieres, with heavy loss. By the end of the month, XIII Corps had gained control of Delville Wood; XV Corps had captured Longueval and had advanced forward to High Wood; and III Corps was positioned along Munster Alley.[27]

Haig convinced himself that these attacks would break the German line and so he persisted with them into August. These attacks would set the stage for his next major attack in September, where he would use a new secret weapon, one that he hoped would ensure the breakthrough that he was so desperate for.[28]

The RFC continued to conduct contact patrols above the advancing infantry and report back to the ground commander. Aerial observation and direction of artillery and aerial reconnaissance also proceeded with little interruption of the German Air Service. However there were subtle changes in German air operations that convinced Trenchard

that the enemy was learning its lessons and was about to change his tactics in the air. On 19 July, the German Air Service supporting von Below's army received three additional reconnaissance flights (*Feldflieger-Abteilungen*) of six aircraft each, one artillery flight (*Artillerieflieger-Abteilung*) of four aircraft, one fighter-bomber squadron (*Kampfgeschwader*) with thirty-six aircraft plus an additional fighter-bomber flight (*Kampfstaffel*) with eight aircraft. Two new fighter squadrons (*Kampfeinsitzer-Staffeln*) had also been formed by combining single seat fighters that had been withdrawn from various artillery and reconnaissance units. As the British began the second phase of the Somme offensive, the German Air Service had greatly increased its strength in that sector to 164 aircraft.[29]

During the first phase of the offensive it was rare for a British pilot to report any contact with German fighters but this changed once the two new *Kampfeinsitzer-Staffeln* arrived on the Somme. Realizing that the Germans were transferring fighter units from the south to reinforce their Somme front, Trenchard had directed Number *32* Squadron with its DH2s to move south to reinforce this sector. They landed at Vert Galand airfield on 21 July. This date would signal a noticeable increase in air combats that would continue for the remainder of the battle.

The previous evening, four aircraft led by Captain R. E. A. W. Hughes-Chamberlain from Number *24* Squadron engaged eleven German aircraft over Flers, shooting down three of them and driving down another two. At 0630 on 21 July, Number *24* Squadron's Captain J. O. Andrews and four other DH2s, along with two FE2bs from Number *22* Squadron engaged five Rolands and five Fokker Eindeckers over Roisel. One of the Fokkers was shot down and three others were damaged while the others were

dispersed. One of the DH2s and both FE2bs were also damaged and forced to return to the British lines. Now with only four aircraft, Andrews continued the patrol towards Peronne where they linked up with the squadron commander, Major Lanoe Hawker. They encountered four LVGs headed for the British lines. Hawker signaled the attack and they chased the German aircraft all the way back to their airfield.

The next day, six RFC aircraft from three different squadrons, including Number *24* Squadron, attacked fifteen German machines over Bapaume in an air battle, which lasted more than thirty minutes. This was very unusual, for most air combats lasted only a few minutes and the trend had been for the Germans to disengage and beat a retreat back to base before they were shot down or damaged. Five German aircraft were shot down with no losses for the British.[30]

This same day Trenchard sent a note to Haig informing him of the noticeable increase in German air activity. He reiterated his message requesting more fighter squadrons and at the same time warned that the enemy may strive to challenge the RFC's supremacy above the Somme.

It was during the second phase of the Somme offensive where Trenchard drew a new wave of criticism. Most of it was focused on the increasing aircrew losses and his refusal to relax the pressure on his squadrons, especially those supporting the Fourth Army on the Somme. Some of it came from his subordinates. In early August, LTC H. C. T. Dowding, commander of the Ninth Wing, requested that one his squadrons, Number *60*, be temporarily withdrawn from frontline service to rest and reconstitute. The squadron had suffered 50 percent casualties since arriving in France. Trenchard agreed with his wing commander and approved the request but he questioned Dowding's

resolve. He understood the strain and demands that he was placing on his aircrews and he also understood that their confidence was shaken by the heavy casualties they were suffering. If this was the case, he did not feel that Dowding, concerned about further heavy casualties, could restore their confidence. He intended to replace the wing commander as soon as events would allow it. Trenchard informed Haig:

> I have had to withdraw one of the GHQ fighting squadrons from work temporarily. . . This squadron, since the battle began, have lost a squadron commander, two flight commanders and one pilot-all killed or missing, and yesterday it lost two more machines and two pilots and two observers by anti-aircraft fire. Besides this, they have had several officers wounded. They have a difficult machine to fly (Morane Parasol), and I think a rest away from work is absolutely necessary.[31]

Only Haig and Trenchard's aide, Major Maurice Baring, understood the monumental burden that the commander of the RFC carried on his shoulders during the first two months of the Somme campaign. He continuously stressed his offensive tactics despite the terrible losses his squadrons were suffering and with the air fighting over the Somme consuming his small reserves, he formulated a plan for what he would require in fighter squadrons and aircrews for 1917.

Trenchard requested ten squadrons to conduct long-range bombing, fifty-six fighter and army cooperation squadrons and sixty observation balloon units. This was more than a fifty percent increase in the overall strength of the RFC on the Western Front. Once his request reached the War Office in London it was passed from office to office but gained little support.[32]

The RFC was suffering heavy losses (thirty-three aircraft shot down with fifty-one aircrew killed, wounded, or missing in July) but not nearly as many as the Germans. Because of this, and the fact that the RFC had gained air supremacy over the Somme,

most political and military leaders back in England ignored Trenchard's request. They argued that the incremental increase of a few squadrons over the previous year's plan would suffice. It was this mentality of attrition warfare, however, that would have almost cataclysmic results for the RFC in the spring of 1917.

It was because of the RFC's success that Trenchard vowed to overcome any obstacle to ensure that his airmen were taken care of. His visits to the twenty-seven squadrons in northern France ensured he had the pulse of his force. He met and talked daily with squadron commanders, pilots, observers and the ground crews. He argued, haggled, cajoled and demanded more fighter squadrons, especially those equipped with the DH2. He also ensured the supply system provided the latest improvements in flying clothing to his men since more than a few suffered from frost bite in their open cockpits. He also established a leave plan for aircrews in which they had to take leave every six-to-eight weeks, primarily to prevent exhaustion and battle fatigue. Trenchard knew the air campaign would last many months. In July and August his aircrews were averaging a minimum of six hours a day in the air. He knew this would have to be sustained long after the ground campaign came to an end if the RFC was to maintain their mastery of the air.

As Trenchard maintained his focus on the readiness and capabilities of his operational squadrons, he also directed that the bombing campaign concentrate on interdicting the movement of reinforcements and the destruction of enemy logistics centers and depots behind the German front lines. By doing this he knew it would greatly support the Fourth Army and at the same time keep the German Air Service on a defensive footing. With this in mind he identified a new target worthy of his bomber

squadrons: the German airfields themselves. From mid-July through early September RFC bombers began to take the war directly to the German Air Service. Although in most cases only several hangers or aircraft were destroyed, the effects were much greater on the morale of the German airmen.

The German airfields at Douai, Queant, Bertincourt, Velu, Beaucamp, Trescault, and Hervilly were all attacked repeatedly during this eight-week period, primarily by two squadrons: Number *27* and Number *70*. What was unique was the fact that Number *27* Squadron was an RFC squadron whereas Number *70* Squadron was on temporary attachment to the RFC from the Royal Naval Air Service (RNAS). These two units worked well together and proved that there was little difference between the two air services. The major difference being that the RNAS was equipped with better, more modern aircraft than the RFC. Their Sopwiths were equipped with the newly designed Scarff ring mount, which revolutionized the observer's ability to quickly train and aim his Lewis machine guns onto incoming enemy aircraft. In fact this new gun mount had a direct impact on crew and aircraft survivability which RFC aircrew much appreciated. Trenchard demanded that all RNAS and RFC two-seaters be immediately equipped with this new and improved gun mount. It would prove so successful that the French and American Air Services would adopt it for their own aircraft later in the war.[33]

The RFC also concentrated on the destruction of German observation balloons, which were used in similar fashion by the British, as a source to gather intelligence and to observe and direct artillery fire. In the first week of August alone the RFC conducted thirty aerial attacks against the German balloons along the Fourth Army Front, destroying six of them. [34]

Balloons were extremely difficult to destroy as they were protected on the ground by several anti-aircraft batteries and normally had at least one flight of aircraft flying a protective barrage patrol around them. To destroy a balloon, the British pilot would have to penetrate an incredible amount of antiaircraft fire or "archie" and get through the flight of enemy fighters. One pass was about all the attacking pilot would get before he would need to fight his way home, usually into a stiff west wind.[35] Needless to say the odds were against the attacking pilot.

As the ground battle continued into late August, the RFC maintained its superiority in the air. Corps aircraft supported the infantry with daily contact patrols and the artillery by directing their fires, with little interference by the enemy. They also continued their bombing campaign against German logistic sites and airfields with more and more success. The army squadrons sought out and engaged any German aircraft they could find and protected the corps aircraft from the enemy fighters that did try to intercept them.

There were three main reasons that the RFC was able to maintain aerial supremacy over the Somme as the offensive entered its third month: (1) the continuation of Trenchard's offensive policy of taking the air war to the enemy; (2) the German Air Service' continued reliance on a defensive strategy; and (3) the superiority of the British fighters over the German Fokkers, most especially the DH2, the FE2b, and the Sopwith 1 and 1/2 Strutter.[36] According to the German official history, July and August 1916 were the blackest days in the history of the German Air Service.

For the German Air Service, the end of August was significant in that at long last, the in-balance in tactics, leadership and equipment was to be addressed. On 29 August

Field Marshal Paul von Hindenburg replaced Erich von Falkenhayn as Chief of the General Staff. Hindenburg assigned General Erich von Ludendorff to be his Quartermaster General. Ludendorff was an advocate of the airplane and he believed it could and should be a prominent weapon on (above) the modern battlefield.

The change in leadership had a huge impact for the Germans on the ground and air forces fighting on the Somme. First, von Hindenburg directed that the German Second Army, under von Below, should be divided into two armies. The area south of the Somme was assigned to the Second Army and the area north of the Somme was assigned to the newly designated German First Army.

The German Air Service order of battle was changed to allow the transfer of numerous aircraft formations supporting the battle at Verdun to the Somme front. By 1 September von Below controlled seventeen *Feldflieger Abteilungen,* twelve *Artillerie Flieger Abteilungen,* four *Kampfgeschwadern,* two *Kampfstaffeln,* and sixty fighters formed up in a number of *Kamfeinsitzer Kommandos*.[37]

Two other important organizational changes took place within the German Air Service in late August. The first was the establishment of a *Gruppenfuhrer der Flieger* (*Grufl*) within each German corps headquarters. The mission of the *Grufl* was to coordinate the tactical use of the *Feldflieger Abteilungen* that provided air support to the corps. The second major change was the establishment of the first *Jagdstaffel* (Hunting Squadrons) or *Jasta.* These units were formed for the sole purpose of aerial combat. They were to hunt out enemy fighters and destroy them and in doing so allow their army co-operation aircraft the freedom to accomplish their assigned missions. Secondarily the *Jastas* were to destroy British and French observation and reconnaissance aircraft,

especially those conducting artillery direction and observation.[38] Each *Jasta* was to have a complement of fourteen aircraft. In September these new fighter squadrons would receive the best trained and most experienced pilots across the air service.[39]

The great Oswald Boelcke, not allowed to participate in the first two months of the Somme battle, was given command of Fighter Flight 2 (*Jagdstaffeln*). He was given free reign to hand pick the pilots he needed from all over the German Air Service to man this new fighter squadron. *Jagdstaffeln* 2 (Jasta 2) was also the first unit to receive the new Albatros fighter plane on 16 September. The dominance of the RFC and its fighter aircraft was about to be challenged for the first time since the start of the battle of the Somme.

During the first two weeks of September, those German fighter squadrons stationed on or being transferred to the Somme front, began receiving three new fighters, the Albatros D1 and D2, and the Halberstadt D2. All three aircraft were equipped with two fixed machine guns synchronized to fire through the propeller whereas all the new British tractor type fighters had only one. These new German fighters were also strongly built to sustain the rigors of air combat and were very maneuverable, having the ability to sustain long, steep dives, a distinct advantage over their allied counterparts.[40]

As more and more German ground divisions and air squadrons arrived on the Somme, it was evident to both Haig and Trenchard that at least one of their objectives was being accomplished: reducing the pressure on the French Army at Verdun. However, as August became September, it was also evident that the German First and Second Armies were not about to break and run. Trenchard wrote:

> I knew by early September that the Germans would not collapse because our army was unable to take advantage of the situation. I also foresaw that the Germans would recover in the air. . . and might even wrest supremacy from us unless our reserves increased and our weapons improved. Generals like Rawlinson thought I must have got jumpy, worrying in case the enemy would do to us what we had just done to them, but how true my forebodings turned out to be.[41]

The buildup of German air units and intelligence gained from captured aircrew were added proof that Trenchard was correct in his estimation. He was so convinced that air supremacy over the Somme was in jeopardy that with Haig's consent he drafted a letter to the War Office (Appendix C). The three-page letter was a summary of the British air strategy in effect over the Western Front and especially the Somme. It argued with great detail why an offensive strategy would always defeat a defensive one. That if the Germans tried to change to offensive operations than the best policy would be to pursue a more vigorous offensive strategy against them and force them "to do what he would gladly have us do now."[42]

In early September, Haig directed Rawlinson to prepare his army for a major attack to occur not later than the fifteenth of the month. He was not pleased with the progress of the Fourth Army or the results achieved in the last eight weeks since the campaign had started. During the weeks from 15 July to 14 September, the Fourth Army had advanced only 1,000 yards on a front of five miles and suffered 82,000 casualties for these small gains.[43] On 14 September High Wood still had not been captured. Guillemont and Ginchy were at last captured after many weeks of hard fighting on 3 and 9 September, respectively. Both villages and High Wood were to have been captured in the first week of the offensive.

From mid-July on, Rawlinson basically directed a long series of successive small attacks that were rarely synchronized between the battalions, brigades and divisions directed to conduct them. Prior and Wilson in their book *Command on the Western Front* estimate that the Fourth Army conducted ninety operations (attacks by at least one battalion) during the sixty-two period, only six of which occurred across the entire Fourth Army front.[44] Rawlinson's directive to conduct "bite and hold" attacks caused much higher casualties to the British than the Germans, with little success to show for it.

Though the BEF commander-in-chief was upset with his Fourth Army commander for his lack of success during the second phase of the Somme offensive, both he and Rawlinson were more than pleased with the performance of the RFC and how well it had supported the Fourth Army and the BEF overall during the summer campaign.[45]

An assessment of how well the RFC supported the Fourth Army at the end of Phase II of the offensive (14 September) reads very similar to the plaudits already stated for the end of Phase I. The corps squadrons performed almost flawlessly in accomplishing their reconnaissance, photography, and artillery observation and direction missions. The bomber squadrons had a greater impact than anyone in the British chain of command, ground or air, could have anticipated. Three squadrons had prevented at least two German divisions from reaching and reinforcing the enemy front lines when their trains were attacked and immobilized in July and August, respectively. The RFC bombed numerous logistic sites, troop encampments, several corps and division headquarters, causing much chaos and confusion amongst the enemy's command, control and support of its forces. The bomber squadrons also had much success in attacking almost all of the

German Air Service squadrons opposite the British Fourth Army. A captured German aviator stated "Enemy airplanes in squadrons of six, eight, and ten or more worked over our airdromes with almost absolute impunity."[46]

The army squadrons, consisting of Number *22* Squadron (FE2bs) and Number *24* Squadron (DH2s) had achieved just as much success as their comrades in the corps flying units. These two squadrons were largely responsible for achieving air supremacy above the Fourth Army and then maintaining it. The German fighter units suffered heavily in the first two months of the battle of the Somme. They would have suffered even greater losses if not for the fact that the German Air Service refused to commit itself to engaging in aerial combat, unless the numerical advantage was in their favor. The German decision to fly only on their side of the line also had much to do with preventing even heavier losses than they did in July and August.

As Phase II ended, Haig and Rawlinson may not have been happy with the staunch defense put up by the Germans or the lack or progress made by the British and Commonwealth divisions, but neither commander had any complaints for the RFC or its performance during the second phase. Both were keen supporters of Trenchard and would do all in their power to get him the men and the aircraft he required to maintain the air supremacy he had achieved above the Somme.

In their correspondence to the War Office both Haig and Rawlinson were on record praising the hard work and sacrifices made by the aircrews in accomplishing the six missions that they and Trenchard had assigned them.[47] If the War Office could provide more and better fighter aircraft and more trained pilots and observers, the RFC's dominance over the Somme would continue unchecked, regardless of what the enemy

might do. Both Haig and Rawlinson believed that the third and final phase of the offensive would break the German First and Second Armies and the airplane, along with a new weapon of war, the tank, would be critical to that success.

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[1]H. A. Jones, *The War in the Air,* vol. 2 (London: Hamish Hamilton, 1969), 214.

[2]Robin Prior and Trevor Wilson, *Command on the Western Front* (Oxford: Blackwell Publishers, 1992), 203-204.

[3]Ibid., 215-216.

[4]Ibid., 217.

[5]Peter Hart, *Somme Success* (Barnsley, England: Pen and Sword Books, Ltd., 2001), 74.

[6]Ralph Barker, *The Royal Flying Corps in France: From Mons to the Somme* (London: Constable and Company Limited, 1994), 164-165.

[7] Jones, 214.

[8]Gwilym H. Lewis, DFC, *Wings Over the Somme, 1916-1918* (Clwyd, Wales: Bridge Books, 1976), 47-48.

[9]Alex Revell, *Victoria Cross: WWI Airmen and their Aircraft* (Stratford, CT: Flying Machine Press, 1997), 78-79.

[10]Martin Middlebrook, *The First Day on the Somme* (New York: W. W. Norton and Company, Inc., 1972), 201-202.

[11]Jones, 210-212.

[12]Ibid.

[13]Ibid., 213-214.

[14]Middlebrook, 229.

[15]Gary Sheffield, *The Somme* (London: Cassell, 2003), 68.

[16]Jones, 219-220.

[17]Andrew Boyle, *Trenchard* (London: Collins, 1962), 183.

[18]Ibid., 183-184.

[19]Jones, 234

[20]Ibid.

[21]Ibid.

[22]Ibid., 235.

[23]Ibid., 236.

[24]Charles Carrington, *Soldier From the Wars Returning* (New York; David McKay Company, Inc., 1965) 110. Also see Terraine, 155; Farrar-Hockley, 122; Brown, 165-166.

[25]Nigel Steel and Peter Hart, *Tumult in the Clouds* (London: Hodder & Stoughton, 1997), 129.

[26]Barker, 166-167.

[27]Martin M Evans, *The Battles of the Somme* (Osceola, WI: Motorbooks International Publishers, 1996), 38-42.

[28]Hart, 131.

[29]Jones, 236.

[30]Ibid., 262-263.

[31]Barker, 172.

[32]Boyle, 184-185.

[33]Jones, 261.

[34]Alex Imrie, *A Pictorial History of the German Army Air Service, 1914-1918* (Chicago: Henry Regnery Company, 1971), 34.

[35]Jones, 154. The prevailing westerly winds in France assisted German airmen in several ways. If they crossed the lines without being observed they stood a good chance of completing their mission and getting back to their own lines before they could be intercepted, their escape being made easier by the extra speed the wind gave them at their backs. On the other hand British airmen, although helped by the wind flying from west to east into enemy territory, knew that their return flight would be into the wind, greatly effecting their speed, a fact which the German airmen and anti-aircraft batteries could take adavantage of. If the British airmen were wounded or his aircraft was damaged, getting safely back to friendly lines was always difficult and sometimes impossible. The German airmen, in a similar situation over British lines, could put his aircraft into a dive

and beat a hasty retreat to safety, greatly assited by a strong west wind. As the war progressed and engine power increased, this disadvantage, although still operative, was diminished. However, during the 1914-1916 period of air fighting it was a very real handicap for the RFC.

[36]Air Historical Branch, *The Royal Air Force in the Great War* (Nashville: The Battery Press, 1996), 123.

[37]Imrie, 35.

[38]Ibid., 41.

[39]Ibid., 38.

[40]David C. Cooke. *Sky Battle 1914-1918* (New York: W. W. Norton and Company, Inc., 1970), 107.

[41]Boyle, 186.

[42]Jones, 472.

[43]Prior and Wilson, 203-204.

[44]Ibid.

[45]Trevor Wilson, *The Myriad Faces of War* (New York: Polity Press, 1986), 370-371.

[46]Ezra Bowen, *Knights of the Air* (Alexandria, VA: Time-Life Books, 1980), 93.

[47]Jones, 222.

CHAPTER 4

THE BATTLE OF THE SOMME PHASE III (15 SEPTEMBER-18 NOVEMBER 1916) THE GERMANS REORGANIZE: BIRTH OF THE LUFTSTREITKRAFTE

The third and final phase of the Somme offensive began on 15 September with a major attack that would become known as the Battle of Flers-Courcelette (see figure 4). Haig was convinced that the Fourth Army could still cause a major breakthrough of the German defensive positions if it attacked with enough force and vigor. He also believed that by using the elements of shock and surprise predicated by a new weapon, the tank, success could be achieved with small loss to his infantry divisions. The tank had been tested with great secrecy in England and then again in France, where both Haig and Rawlinson observed it with high expectations for the coming battle.[1] Haig had wanted at least 100 tanks for the initial attack on 1 July but the tanks had not been ready and by 15 September there were only forty-nine Mark I tanks available to Rawlinson's command. There were many who questioned the small number and whether they should be used at all, but the human cost of the battle so far, made it imperative to test the new weapon under combat conditions and see if it would break the impasse of trench warfare.[2]

An intense artillery bombardment began on the morning of 12 September but the weather turned bad in the afternoon and the heavy rain continued for the next thirty hours. This bad weather greatly hampered the RFC's ability to observe and direct the artillery which in turn greatly reduced the effectiveness of the bombardment. The weather broke on 14 July, allowing the RFC to accurately direct the artillery onto its targets for the last day of the bombardment.

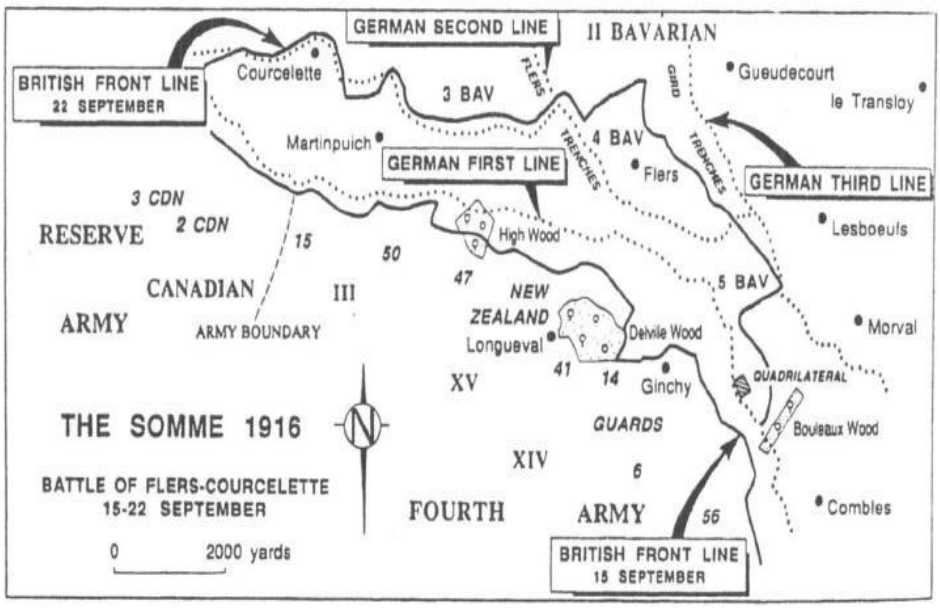

Figure 4. The Somme, 1916: Battle of Flers-Courcelette, 15-22 September

Source: Robin Prior and Trevor Wilson, *Command on the Western Front* (Oxford: Blackwell Publishers, 1992), 238.

To ensure that the forty-nine tanks reached their assembly areas unobserved by the enemy, Trenchard directed that all German observation balloons along the Fourth Army front be attacked. Fourth Army also requested that the RFC provide aircraft to conduct night flying missions above the tanks, to cover the noise they made as they moved forward the night before the attack.

Early on the morning of the fifteenth, Trenchard and his aide, Maurice Baring, visited Number *60* Squadron. The RFC commander gathered all the pilots around him and informed them that during the night the Germans had hoisted three observation balloons opposite the British tank assembly areas. It was not clear if the Germans had seen anything of the new weapon but Number *60* Squadron, with its Nieuport 11's and its

Le Prieur rockets, was the only unit that could effectively engage and destroy the enemy balloons on such short notice. Trenchard asked for volunteers. Three men stepped forward. He spoke to each man in turn and to the last he said, "Good luck Gilchrist. But remember this: it's far more important to get that balloon than to fail and come back."[3] Trenchard watched the three aircraft take off, realizing that as well defended as the enemy balloons were, that he may in fact have just sent three young men off to certain death. He waited anxiously for word when Fourth Army headquarters called and reported that the three balloons had just fallen to earth in flames. Long minutes later the three Nieuports returned, all badly damaged but their pilots unharmed.[4]

Less than an hour later, at 0620 on the fifteenth, nine British divisions, consisting of fifty infantry battalions, left their trenches. Each of the attacking division used what had become known as the "creeping barrage," friendly artillery fire that the advancing infantry kept as close to as possible as they moved forward across no-man's land. This type of barrage fire provided protection to the attacking infantry but also did a good job of killing the many German machine-gun teams that positioned themselves in shell holes between the trenches.[5]

Lieutenant Cecil Lewis, a pilot in Number *3* Squadron, was assigned to conduct a contact patrol with the lead tanks on the morning of the 15 July. He was airborne before first light and had a grandstand view of the first use of tanks in combat.

> When we climbed up to the lines, we found the whole front seemingly covered with a layer of dirty cotton-wool-the smoking shell-bursts. Across this were dark lanes, drawn as it might be by a child's stubby finger in dirty snow. Here no shells were falling. Through these lanes lumbered the Tanks in file, four to each lane. By 0620 they had reached the front line and the barrage began to roll back as they advanced, the infantry with them. We could see them sitting across the trenches

> and enfilading the enemy with their four-pounders. By eight o'clock the complete network of trenches known as Switch Line and Flers Line was taken.[6]

The British XV Corps, in the center of the attack, made significant progress and as Lewis observed, the 41st Division with twelve tanks of seventeen still in action, captured the fortified town of Flers, destroying two German battalions in the process. The gains won by the three divisions within the XV Corps could not be exploited however because Haig had put all his divisions into the attack and had no reserve.

Elsewhere on the British left and right (III Corps and XIV Corps respectively), the XIV Corps suffered the heaviest casualties as they assaulted from Combles to Ginchy. The tanks had been directed to attack three important strongpoints: Bouleaux Wood, the Quadrilateral between the British front line and the German first position, and the Triangle, a series of trenches in the German front line. Thirteen of the fifteen tanks failed to link up with the infantry and the 56th, 6th, and the Guards Division suffered great losses, mainly to machine-gun fire. In the III Corps sector, tanks assisted the 15th (Scottish) Division in capturing Martinpuich but fire from High Wood prevented the other two divisions in the corps from capturing any ground.

The RFC did its best not only to take German lives but to save British ones during the attack. A BE2c crew, Captain C. H. B. Blount and Lieutenant T. S. Pearson from Number *34* Squadron, on contact patrol with the three tanks supporting III Corps, reported back to corps headquarters via a dropped message, that at 1000 they had observed the three tanks, one ditched and abandoned in a British trench, one upended against a tree and the third on fire straddling the German trenches. Deprived of tank support, British troops attacking High Wood were pinned down. The RFC crew flew back to the landing field next to III Corps headquarters to brief the commander that

attacking troops on either side of the wood had pushed past High Wood, had linked up and were consolidating their positions. Blount and Pearson found the staff planning a frontal attack on the German trenches straddling High Wood for that afternoon. The RFC crewman noted:

> This would have resulted in the complete wiping out of the attacking force, for the enemy trench was manned literally shoulder to shoulder with a machine gun every few yards, and most of the wire uncut.[7]

Based on the eyewitness report from the two aviators, the corps commander realized that the Germans in High Wood were surrounded and that they would be forced to surrender. He canceled the attack. At 1300, the German units occupying High Wood did in fact surrender.

Despite the setbacks on the left and right and that most of the stated objectives for the attack had not been captured, Haig and Rawlinson viewed the day's advances as having been successful. Of the three German trench lines attacked by the Fourth Army, the first had been captured on a front of 9,000 yards. More than 4,000 yards of the second trench line around Flers had also been taken. Two key strong points that had held up the British advance since mid-July, had been captured: High Wood and the Switch Line. The fortified villages of Courcelette, Martinpuich, and Flers had all been captured and best of all the Fourth Army had at last seized the Bazentin Ridge. The British would now have good observation over the entire German forward and rear areas. Rawlinson's forces were also in good position to attack and seize the German third line in the days ahead.[8] On the negative side, the German third line was still intact, German morale had not collapsed as Haig believed it would and a breakthrough had still not occurred on the

Somme. Worse still was that the ten British divisions had suffered almost 30,000 casualties.[9]

The fifteenth of September was also a very successful day for the RFC. Its squadrons flew more hours and engaged in more air combats than on any other single day since the war began. The corps squadrons did great work locating and engaging German artillery batteries. RFC aircrew used the Zone Call for Fire repeatedly throughout the day targeting 159 enemy artillery batteries. They were able to direct and observe artillery fire on seventy of them, destroying twenty-nine, thirteen by direct hits.[10] The corps squadrons also flew contact patrols continuously until well after the infantry had consolidated their gains. Rawlinson, his corps and division commanders had been kept fully informed on the progress or lack thereof of their units throughout the day from messages dropped by aircraft or in person briefings provided by the RFC aircrews.

The bomber squadrons dropped a total of eight and a half tons of bombs, a Herculean feat for the period. Targets attacked included General von Below's Second Army headquarters at Bourlon by Number *27* Squadron, who also managed to shoot down four enemy aircraft during the raid, losing one of their own. Number *27* Squadron also bombed the railheads at Achiet-le-Grand and Velu, striking at least three trains in the process. Later in the day three aircraft from the same squadron attacked a train carrying a German division up to the front as reinforcements. The three aircraft bombed simultaneously. The first bomb struck the engine bringing the train to a halt. The second aircraft bombed the rear of the train with even deadlier results. The 112-pound bombs from the third aircraft hit an ammunition car in the middle of the train which in turn set off a chain reaction that blew up several train cars attached in front and behind it.

Another five bombers from this squadron hit trains at Ribecourt and Epehy and a logistics site at Bantouzelle with great effect. German corps and division headquarters in Bapaume were also bombed by at least three RFC squadrons.

Many of the air combats that took place on 15 September took place above Bapaume. FE2bs from Number *11* Squadron shot down four German fighters and forced another two down without loss. Number *60* Squadron destroyed three enemy aircraft also without loss. All total, fourteen German aircraft were shot down over the German lines opposite the Fourth Army, another six being damaged and forced to land. RFC casualties were six aircraft shot down with nine pilots and observers missing, five wounded, of whom three later died of their wounds. The impact of these air combats gives testimony to the success of the RFC's fighter squadrons in support of Rawlinson's army that day. By mid-afternoon, Number *70* Squadron conducted a reconnaissance of the Fourth Army front and reported seeing not one German aircraft during its three-hour patrol.[11]

Forty-eight hours later the RFC would suffer some of its heaviest losses since the Somme offensive began. At 0930 on 17 September, eight BE2cs from Number *12* Squadron, each carrying one 112-pound bomb and four 20-pound bombs, took off from their airfield at Avesnes-Le-Comte. By 1030 they had linked up with their escort, six FE2b's from Number *11* Squadron, and crossed the lines. Their target: the Marcoing railhead, a key logistics center for the German Second Army. Two of the BE2cs were forced to turn back due to engine problems but the remaining six pushed on. The British bombers dropped thirty bombs on the rail center, creating a large fire and causing numerous secondary explosions. Before the RFC crews could conduct an assessment of the raid, five German Albatros fighters from Jasta 2, led by Hauptmann Oswald Boelcke,

attacked the bombers from above. Seven other German fighters arrived and joined the fight. Now there were twelve German aircraft against twelve British.

In numbers the two sides were equal but in fact the Germans had a distinct advantage. Boelcke and his pilots were flying the brand new Albatros DI fighter plane. It had a much improved Mercedes six-cylinder in-line engine and was armed with two forward firing machine-guns. Six of the British aircraft were BE2cs, aircraft that had been outdated back in 1915 and should not have been in service in front line squadrons. Short of new aircraft, Trenchard was forced to use them for reconnaissance, artillery observation and bombing. What was worse, because they had been conducting a bombing mission, none of them carried their observer-gunners. Thus the only real defense for these aircraft was evasive flying by the pilot.

The six FE2bs did what they could to protect the bombers but Boelcke and his pilots, in their faster, more maneuverable fighters, focused on the RFC fighters and within minutes shot four of them down. The Germans then attacked the BE2cs, shooting two down before four RFC aircraft from Number *60* Squadron arrived to lend support. It is doubtful if any of the BE2cs or FE2bs would have made it back to their airfield had Number *60* Squadron not arrived to drive off the German aircraft.[12]

Boelcke was pleased with the performance of his flight. Of the five, only he was an experienced fighter pilot. He had scored his 27th aerial victory:

> I engaged the leader's machine, which I recognized by its streamers and forced it down. My opponent landed at Equancourt and promptly set fire to his machine. The inmates were taken prisoner; one of them was slightly wounded. The pilot had to land because I had shot his engine to pieces.13

One of his fledgling pilots, Manfred von Richthofen, had shot down his first aircraft, one of the escorting FE2bs. No one, not even Boelcke, could know that von

Richthofen would become the highest scoring fighter pilot of the war with 80 confirmed aircraft shot down. It had been a very good day for Boelcke and his Jasta. Six British aircraft shot down, without loss to his flight. There was even better news in that the new aircraft had performed superbly in combat and more of them were en route to the other fighter squadrons on the Somme. From 17 to 30 September, Jasta 2 would receive credit for downing twenty-five British aircraft for the loss of three pilots.[14]

It did not take the RFC long to realize that this single air combat was a major turning point in the air war over the Somme. Based on the accounts of the four surviving aircrew from Number *11* Squadron, Trenchard believed that the Germans had assigned at least one new fighting squadron to the Somme sector. It was now evident that the Germans had in their possession, a faster, more maneuverable fighter, armed with two fixed, forward firing machine guns.[15] The commander of the RFC knew that the pendulum was swinging against his aircrews and without better, more advanced aircraft than those his squadrons were presently flying, the RFC's hold on air supremacy above the Somme was in jeopardy.

When September ended it was determined that the RFC had shot down twenty-seven German aircraft during the past month but had suffered 170 aircrew casualties in the process. Trenchard knew the numbers partly reflected the Germans advantage of being on the defensive but he also knew that by introducing several new fighters that were better than most, if not all of the aircraft in the RFC inventory, the Germans were now ready to challenge the British for air supremacy over the Somme.

On 29 September, with Haig's approval, Trenchard drafted a letter to the War Office (see Appendix E). In it he requested that the number of fighter squadrons attached

to each of the BEF's five armies be immediately doubled from four to eight, which would give the RFC twice as many fighter squadrons as corps squadrons. Haig added to the letter:

> Throughout the last three months the Royal Flying Corps in France has maintained such a measure of superiority over the enemy in the air that it has been enabled to render services of incalculable value. The result is that the enemy has made extraordinary efforts to increase the number, and develop the speed and power, of his fighting machines. He has unfortunately succeeded in doing so and it is necessary to realize clearly, and at once, that we shall undoubtedly lose our superiority in the air if I am not provided at an early date with improved means of retaining it. . . . The result of the advent of the enemy's improved machines has been a marked increase in the casualties suffered by the Royal Flying Corps, and though I do not anticipate losing our present predominance in the air in the next three or four months, the situation after that threatens to be very serious unless adequate steps to deal with it are taken at once.[16]

The War Office responded by directing the Admiralty to form a new fighter squadron from volunteers among the RNAS squadrons based at Dunkirk. The new unit, Number *8* (Naval) Squadron, was equipped with six agile Nieuport 17's, six Sopwith 1 and 1/2 Strutters and six of the latest fighter aircraft, the Sopwith Pup, a fast, highly maneuverable and easy to fly fighter which would become one of the best fighter aircraft of the war. *Naval 8*, as the unit became known as, was attached to Trenchard's command effective 27 October. The unit flew its first patrol on 3 November and shot down twenty German aircraft in the next eight weeks. Five other similarly equipped RNAS squadrons would be attached to the RFC over the next five months and would make a significant contribution to the RFC and Haig's armies in 1917.[17]

As Trenchard demanded more and better fighter aircraft from his government, the German High Command directed the most significant organizational change in the German Air Service's short history. On 8 October, general headquarters issued a decree signed by Kaiser Wilhelm:

> The increasing importance of the air war requires that all air-fighting and defense forces in the army, in the field and in the hinterland, be united in one agency. To this end I command: The centralized improvement, preparation, and employment of this means of warfare will be assigned to a "Commanding General of the Air Forces," who will be directly subordinate to the Chief of the General Staff. The "Chief of Field Aviation," with the dissolution of that post, becomes "Chief of Staff to the Commanding General of the Air Forces."[18]

General Ernst von Hoeppner, a cavalry officer who was commanding the 75th Infantry Division, became the commanding general of the air forces, or Kogenluft. His chief of staff was Colonel Hermann von der Leith-Thomsen (he had been the Chief of Field Aviation). The Inspector General for the Air Force would remain the very experienced Major Wilhelm Siegert (previously von der Leith Thomsen's deputy commander). The German Air Service also received a new title: Luftstreitkrafte (Air Force). These three capable leaders would form a triumvirate that would mold and build the Luftstreitkrafte into one of the most effective air forces of the First World War. All flying formations were now to be controlled by one headquarters and one commander. Like the RFC, however, the German Naval Air Service remained separate and apart from Hoeppner's command.[19]

Within a week it was very evident that Hoeppner and his command team were making great strides in the restructuring of the Luftstreitkrafte. By mid-October there were thirty-eight squadrons (333 aircraft of which 45 were fighters) supporting the German First Army. These aircraft were actively engaged with the French Air Service as well as the RFC. The German Second Army had 207 aircraft supporting it, of which forty-four were fighters. Opposing these air units, the RFC's 3rd, 4th and 5th Brigades had 383 aircraft, of which seventy-three were fighters, either DH2s, FE2bs, Nieuport 11s or Sopwith Pups. Based on the disposition of the respective armies, the RFC still

maintained a numerical edge of forty-five aircraft. But quantity was no longer the key factor. The RFC did not have a fighter plane that could match the Albatros D types, either in performance or firepower.[20]

In only a few short days, the huge advantage the RFC had in numbers of aircraft on the Somme was gone. This massing of aircraft opposite the British Fourth Army, allowed the Germans to achieve temporary air superiority when supporting local counter-attacks on the ground. With the introduction of the *Jagdstaffeln* and the Albatros DI and DII fighters, the Luftstreitkrafte began the process of wresting air supremacy away from the RFC before the Somme offensive was over.[21]

The Fourth Army conducted ground attacks on 7, 12, and 18 October, but none were successful. What was worse, a pattern was discernable in the results. Prior and during each attack, bad weather had hampered the RFC from observing for the artillery, negating an effective bombardment, and steady rain began to turn the ground into a quagmire, making it extremely difficult for the infantry, and even more so for the artillery, to advance. Haig and Rawlinson still demanded and expected positive results. Further attacks against the Transloy Line occurred on 23, 28, and 29 October but not a yard of ground was gained. The Fourth Army had fought their way into a valley at the end of September and since that time had been trying to fight their way out of it. Rawlinson knew that the worsening weather and the onset of winter would end the campaign before the year was over. He thus committed his army to another series of attacks to gain the high ground that the Transloy Line was situated on. As Prior and Wilson noted in their book *Command on the Western Front:*

> The prospects for future operations were now extremely bleak. Incessant rain had turned the battlefield into a quagmire. Only with the greatest difficulty could ammunition for the guns and food and water for the troops reach the front. The mud confined all traffic supplying the Fourth Army to a single road from Longueval to Flers.[22]

During the last two weeks of October, the Luftstreitkrafte made determined efforts to prevent British reconnaissance and artillery observation from accomplishing their missions deep behind the German lines. The RFC daily communiqué for 20 October reports more than eighty air combats taking place and British casualties were heavy (three pilots killed, five wounded, and three missing), causing Trenchard to transfer three corps and two fighter squadrons from the north down to the Fourth Army sector. Two new squadrons also arrived from England, Number *41* (13 October) and Number *46* (26 October). Number *41* was equipped with the FE8, very similar to the DH2 but already obsolete. Number *46* flew Nieuport two-seaters.[23]

Lieutenant Gwilym Lewis, a fighter pilot flying the DH2 with Number *32* Squadron, noted the increased aggressiveness in the German pilots. On 23 October he wrote:

> It so happens that just at present we are living in busy times. The Huns are making the best effort to take over the air supremacy they have made since July, and a lively time they are giving we poor wretched DH pilots who are responsible for keeping them back. . . . The good days of July and August, when two or three DHs used to push half-a-dozen Huns onto the chimney tops of Bapaume, are no more.[24]

At the height of its increasing success, the Luftstreitkrafte suffered a terrible blow to its tactical leadership at the *Jagdstaffeln* level. On 28 October two DH2s from Number *24* Squadron, piloted by Lieutenants Knight and McKay, were attacked by Boelcke and eleven other fighters from Jasta 2 over Pozieres. Two of the Albatros fighters dived upon Knight and collided, one was seen to lose pieces from one of its wings before it glided

away into the clouds. The two British pilots beat off every attack and were surprised when the nine German aircraft broke away and allowed the DH2s to return to their airfield unmolested. It would be several days before Knight and McKay would learn that the Albatros fighter with the damaged wing had actually crashed only minutes after the collision, its pilot killed. At the same time they learned that the pilot had been the great Oswald Boelcke.

In less than eight weeks on the Somme, Boelcke had shot down twenty British aircraft, bringing his victory total to forty, two days before he was killed.[25] As an innovator and teacher of fighter tactics, Boelcke had no peer within the Luftstreitkrafte. He led his Jasta with skill and courage, earning the respect of his own army and air service but also that of the RFC. In leading his squadron he played a significant role in challenging the RFC's supremacy over the Somme. While on the Somme, he had developed and written what became known as the Dicta Boelcke (see Appendix D), the standard reference for German pilots on air fighting and fighter tactics. It would be printed many times and issued to a new generation of German fighter pilots during World War II.[26] Many of its tenets are still in use today. The good news for the Germans was the legacy that Boelcke had left his pilots. In the coming year, many of them would equal or surpass his number of aerial victories. Longterm, a half dozen would rise to the rank of general officer as leaders of the Luftwaffe in the next world war. In his honor, Jasta 2 was renamed Jasta Boelcke. Captain Hans Ritter, in his work *Der Luftkrieg* (The Airwar) states:

> Under the leadership of Boelcke the German Jagdstaffels accomplished the wonderful feat of gradually checking the activities of the enemy aircraft to such an extent, despite their numerical superiority, that our own reconnaissance

> machines were eased of their burdens and could work again; at the same time they had sufficient forces left to put a very perceptible check on the activities of the enemy artillery planes that hitherto worked practically unmolested. . . . The attacks of the Entente lost a considerable amount of thrust when their unconditional supremacy of the air was abolished.[27]

The accomplishments of the RFC during the remainder of the offensive were not as spectacular as those they had achieved in the spring and summer. For sheer tenaciousness, its pilots and observers struggled through horrendous weather to support the Fourth Army. Through rain, sleet, snow, and in the teeth of a sometimes deadly west wind, the aircrews flew dangerously low to register the guns, conduct reconnaissance and attack infantry and transportation convoys with their machine guns and bombs. There was no doubt that the British infantry suffered much worse from the weather and the conditions it caused, but during every hour of daylight, the soldiers knew that the RFC would be above them, providing whatever support was required. No matter the cost.

The final ground attack took place on 13 November when the Fifth Army, commanded by Lieutenant General Hubert Gough, captured Beaumont Hamel and the remainder of the Thiepval-Ginchy Road. Haig would not forget that the only major success on the ground to occur between 1 October and 15 November had been accomplished by Gough and not by Rawlinson.

The battle of the Somme officially came to a close on 18 November when Haig called a halt to offensive operations (see figure 5). The battlefield had become a quagmire from the continuous rains, which fell from early October on. On 23 November, a week after the battle ended, an aerial combat took place between one of Britain's best pilots and a relatively unknown fighter pilot of the Luftstreitkrafte. This air combat was a significant event in that the results confirmed that unless the RFC received a better fighter aircraft

than the Albatros or the Halberstadt fighters the Germans were flying, it would only be a matter of weeks before the RFC's supremacy in the air over the Somme was over.

Major Lanoe Hawker, VC, DSO, was shot down and killed by, at the time, a relatively unknown German pilot, Leutnant Manfred von Richthofen of *Jasta* 2. Hawker, flying the more maneuverable but slower DH2, found himself in an aerial duel with an enemy flying the faster and better armed Albatros DII. The fight lasted more than thirty minutes which was an incredible feat in and of itself, but running low on fuel and deep behind enemy lines, Hawker was forced to break off the combat. In a race for the British lines, Richthofen followed the British squadron commander, firing burst after burst until he had just 100 rounds left from the 1000 his two machine guns had been loaded with before takeoff. Only 150 feet above the ground, the DH2 was finally hit repeatedly and fell from the sky, crashing less than a hundred yards from the British lines. Richthofen later wrote that he took great pride in shooting down "the English Boelcke":

> My Englishman was a good sportsman, but by and by the thing became a little too hot for him. He had to decide whether he would land on German ground or whether he would fly back to the English lines. Of course, he tried the latter, after endeavoring in vain to escape me by loopings and such tricks. At that time my first bullets were flying around him, for so far neither of us had been able to do any shooting. When he had come down to about 300 feet he tried to escape by flying in a zigzag course, which makes it difficult for an observer on the ground to shoot. That was my most favorable moment. I followed him at an altitude of from 250 to 150 feet firing all the time. The Englishman could not help falling. But the jamming of my guns nearly robbed me of my success. My opponent fell shot through the head 150 feet behind our line.[28]

Little did the twenty-three-year-old von Richthofen know that by the time the war ended two years later he would have shot down eighty enemy aircraft (seventy-eight of them from the RFC) and be recognized as the fighter pilot with the most aerial victories on either side.

Figure 5. The Somme, 1916: The End of the Battle

Source: David G. Chandler, *Great Battles of the British Army* (Chapel Hill: The University of North Carolina, 1991), 115.

Within twenty-four hours both the RFC and the Luftstreitkrafte knew that Hawker had been shot down and killed by a young airman with less than eight week's experience as a fighter pilot. The circle was complete. In June, the Germans had lost their premier fighter pilot in Max Immelman, only two weeks before the start of the Somme offensive. That event had signified that the RFC had gained air supremacy. Then in September the renowned Jasta leader, Hauptmann Oswald Boelcke was killed. Now the death of Hawker was proof that the pendulum had swung back in favor of the German Air Service. Probably of greater significance though was the fact that the best British fighter aircraft on the Western Front, the DH2, had been surpassed by the German Albatros and Halberstadt fighters.[29]

Trenchard and most of his commanders knew that no matter how a good a fighter pilot Hawker was, flying an aircraft that was outmatched by at least three, more advanced German models, in engine speed, maneuverability and firepower, had meant his doom. For the RFC, air supremacy, not only above the Somme, but the entire Western Front, was over unless they received better aircraft than those the Germans were equipped with. Fortunately for the RFC, the winter of 1916-1917 would see a significant decrease in air activity, as Haig and his army commanders paused and waited for the spring weather to renew their offensives on the Western Front.

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[3]Andrew Boyle, *Trenchard* (London: Collins, 1962), 199-200.

[4]Ibid.

[5]Prior and Wilson, 235.

[6]Cecil Lewis, *Sagittarius Rising* (Harrisburg, PA; Stackpole Books, 1963), 142-143.

[7]H. A. Jones, *The War in the Air*, vol. 2 (London: Hamish Hamilton, 1969), 273-274.

[8]Prior and Wilson, 242.

[9]Ibid., 242-243.

[10]Jones, 276.

[11]Ibid., 280-281.

[12]Ibid., 282-283.

[13]Johannes Werner, *Knight of Germany* (London: Greenhill Books, 1991), 211-212.

[14]Ibid. 216.

[15]Ralph Barker, *The Royal Flying Corps in France: From Mons to the Somme* (London: Constable and Company Ltd., 1994), 188.

[16]Jones, 296-297.

[17]Peter Simkins, *Air Fighting, 1914-1918* (London: Imperial War Museum, 1978), 39-42.

[18]John H. Morrow Jr., *German Air Power in the World War* (Washington DC: Smithsonian Institution Press, 1982), 70.

[19]Alex Imrie, *Pictorial History of the German Army Air Service, 1914-1918* (Chicago: Henry Regnery Company, 1971), 39.

[20]Alex Revell, *British Fighter Units Western Front, 1914-1916* (London: Osprey Publishing, Ltd., 1978), 39.

[21]Morrow, 62.

[22]Prior and Wilson, 255.

[23]Christopher Cole, *Royal Flying Corps, 1915-1916* (Chatham, England: William Kimber and Co., Limited, 1969) 287-289.

[24]Gwilym H. Lewis, *Wings Over the Somme, 1916-1918* (Clwyd, Wales: Bridge Books, 1994), 77-78.

[25]Jones, 312.

[26]Werner, vii-viii.

[27]Ibid., 217.

[28]Manfred von Richthofen, *The Red Baron* (New York: Doubleday and Company, Inc., 1969), 61-62.

[29]Peter Hart, *Somme Success* (Barnsley, England: Pen and Sword Books, Ltd., 2001), 220.

CHAPTER 5

CONCLUSION: ASSESSMENT OF THE ROYAL FLYING CORP'S SOMME AIR CAMPAIGN

The Battle of the Somme officially ended on 18 November. Casualties for the three major combatants were horrific: the British Army suffered 419,654, the French 204,253 and the Germans nearly 500,000. At the cost of more than 1.2 million men, an area twenty-five miles long and seven miles deep had changed hands.[1] For a number of reasons, including unseasonable weather, the offensive on the Somme had ended in stalemate. Haig claimed the Somme as a victory. In his dispatch of 23 December 1916, he ignored his original vision and plan for a breakthrough and claimed all along that he had wanted a battle of attrition. In his mind, all three of his major objectives had been achieved. The British Expeditionary Force had relieved the pressure on Verdun, had inflicted heavy casualties on the German Army and had placed the British Army in a more favorable position to win the war in 1917. In a dispatch to London, after the battle Haig wrote:

> Anyone of these three results is in itself sufficient to justify the Somme Battle. The attainment of all of them affords ample compensation for the splendid efforts of our troops and for their sacrifices made by ourselves and our Allies. They have brought us a long step forward towards the final victory of the Allied cause.[2]

According to the official historian of the Royal Flying Corps in the First World War, H. A. Jones, the RFC won a major victory in the air above the Somme.[3] The RFC had gained air supremacy in the spring and early summer of 1916 and had maintained it throughout the entire five-month campaign. From 1 July through 18 November, the battle in the air was fought over enemy territory, even after the Germans had gained the advantage in superior performing aircraft like the Albatros and Halberstadt fighters.

Did the RFC truly accomplish their assigned mission of providing the best possible support to Rawlinson's Fourth Army during the Somme offensive as the official historian would lead one to believe? Haig, Rawlinson and Trenchard had agreed before the start of the battle that the RFC would be required to accomplish six key tasks. These six tasks were: (1) Aerial reconnaissance, (2) Aerial photography, (3) Observation and directing artillery, (4) Bombing, (5) Contact patrols to support the infantry, and (6) Air combat with the Luftstreitkrafte.

Both tasks of aerial reconnaissance and aerial photography were accomplished with skill and relative ease, primarily because the RFC had won air supremacy over the Somme several weeks before the battle began. 19,000 photographs were taken by the RFC during the five-month campaign. From these negatives 420,000 prints were made and issued to army and subordinate headquarters for use in planning their future operations.[4] New and revised maps were also made from the photographs and were issued down to company and platoon level.

By accomplishing both of these tasks on a daily basis, the RFC provided invaluable information and intelligence to Rawlinson and his subordinate commanders, both before and during the conduct of the battle. Prior to each attack the corps squadrons photographed the entire area to be attacked to assist in the rehearsals that were conducted down to battalion level. They reported on the condition of the wire obstacles, the enemy trenches and even on the probable strength of the enemy at critical strong points, such as the Quadrilateral, Courcelette, Martinpuich, and Flers. There were at least two instances where the RFC identified newly dug trenches (the German Third Line between Pozieres

and Bapaume on 14 July and a new trench system built 300 yards forward of the Switch Line which III Corps was about to attack during the second phase of the battle) and reported them in time to allow infantry commanders to alter their attack plans. Had this not been done these two attacks would more than likely have met with disaster.

The third task, deemed the most important by Rawlinson, was that of observing and directing artillery fire. This task provided the most direct support to Rawlinson's Fourth Army during the battle, (and by the last two months of the campaign, Gough's Fifth Army also). The work of the pilots and observers of the RFC, in training and cooperating with the artillery, demonstrated advances and skills never before accomplished in combat. In October General Gough had written:

> During all the three months of fighting, the Air Service had been increasingly active and efficient. Fighting was not confined to operations on the ground . . . Much went on in the air. Gradually and surely our Air Service established a moral and material superiority over the enemy though at the cost of many gallant young lives. But the work done was invaluable-especially in the direction of "blanketing" the enemy's observation of his artillery fire, while they assisted, guided, and directed ours most helpfully. No one of the complicated miscellany of services which comprise a modern army so commanded the respect and admiration of the infantry as did our air service.[5]

A number of German army and corps commanders reported that the success of the British infantry, especially the 14 July battle that captured the Bazentin Ridge and the 15 September battle that captured Flers, was largely due to the superiority of British air and artillery cooperation. The German Quartermaster General, Erich von Ludendorff, acknowledged that the British were supreme in the field, using their aircraft to coordinate effective artillery fire on German units:

> On the Somme the enemy's powerful artillery, assisted by excellent aeroplane observation and fed with enormous supplies of ammunition, kept down our own fire and destroyed our artillery.[6]

In a letter to his commander-in-chief towards the end of the battle, Rawlinson quoted figures to quantify how the RFC had in fact provided great assistance to his ground forces:

> Between the 23rd of July and the 29th of October 1,721 shoots were observed from the air on to enemy batteries, bringing destruction or damage to 521 of them, and silencing 307 others, and that, in addition 281 observations were made of bombardments of enemy trench systems. These figures do not include many shoots based on aeroplane reports, nor shoots directed against troops in movement. The reports on attack days, on the relative positions of our own troops and of hostile troops, furnished by aeroplane observers during the operations, have been remarkably accurate.[7]

Rawlinson added that his experiences with the RFC during the Somme offensive brought home to him the enormous importance of aircraft and artillery cooperation and directed the necessity for even greater advancements in the future with the RFC.

In the same letter, Rawlinson submitted a proposal that the RFC corps squadrons should be placed under the direct control of the Corps Artillery commander. The First Army commander, General Sir H. S. Horne supported Rawlinson, stating that:

> The operations on the Somme had proved that tactical success is largely dependent on superiority in artillery and supremacy in the air . . . and until the direction and control of artillery fire from the air is placed in the hands of the artillery we shall not gain full advantage from our superiority in guns and ammunition.[8]

Haig allowed much debate and discussion through December 1916 but he did not believe that Rawlinson's or Horne's proposals were justified. He was very pleased with the RFC's performance during the Somme battle, especially so with its accomplishments in observing and directing artillery missions throughout the campaign. He saw no need to change a system that in his opinion had been extremely effective under combat conditions. Air to artillery command and control would remain an RFC responsibility. Any shortcomings as there were between the two services could be overcome by the

exchanging of liaison officers. This system of using liaison officers who were trained and understood the roles of both the RFC and the artillery, and how best to utilize them in concert with one another, would pay great dividends in the future. The use of liaison officers between the RFC and the artillery would later see a partnership develop between air squadrons and tank units as the two services refined the tactics for ground-air attack in 1917 and 1918.[9]

Dominick Pisano in his book *Legend, Memory and the Great War in the Air* has stated that the RFC played "an integral part in the offensive" but at the same time believes that Haig and Rawlinson depended far too heavily on a weak and unreliable communication system between aircraft and ground units, that when it broke down, catastrophe resulted.[10] This breakdown in communications between the aircrews and the artillery prevented, in his words "aviators from directing the artillery fire so vital to the success of the offensive. The failure of aviation at the Somme led to carnage on the ground." He further states that: "The five-day (in fact it was seven days), aircraft directed artillery barrage did not cut the barbed wire, annihilate the German defenders, or destroy their fortifications."[11]

Pisano lays much of the blame for the defeat of the Fourth Army on the RFC, focusing on the first day of the Somme offensive but presumably his argument carries through for the entire campaign.[12] He ignores the fact that no matter how well trained the RFC observers were or how effective their wireless communications with the artillery were or were not, the point is moot. It was identified during the preparation for the battle that there was an insufficiency of guns, most especially heavy-caliber guns, and high-explosive shells. This shortage of heavy artillery and ammunition almost certainly

assured that many sections of the enemy wire were not cut adequately enough to allow the infantry to enter the German trenches unobstructed.[13] Was it the RFC's fault that the seven-day bombardment that had seemed so earth shattering had not been nearly as effective as had been planned? More than a million shells of all calibers had been fired on trench lines and objectives that spanned nearly twenty miles. The number and weight of shells per yard of German front that was to be assaulted was actually less than what had been achieved at Neuve Chappelle in March 1915.[14]

Noted Somme historian, Peter Liddle, argues that the British chain of command put far too much faith in the artillery to accomplish the above missions. There was considerable difference in each of the corps and divisional understanding of the artillery preparation and the lack of trained artillery personnel at all levels were both critical factors for the lack of success attained by the Fourth Army. Liddle reinforces his position by adding that the British failed to understand the true strength of the Germans underground defense network and more importantly that the British bombardment was rendered even less effective by the high density of defective shells, fuzes, and worn-out artillery pieces. He concludes that far too much faith was placed on the artillery to accomplish its critical tasks and combined with the lack of confidence that Rawlinson and Haig had in the New Army battalions, produced the debacle that the Fourth Army experienced on 1 July.[15] Peter Hart in his book *Somme Success* adds:

> The absence of a proper creeping barrage meant that the British guns lifted their fire from the German front line and began to pound the rear areas just as their troops went over the top across No-Man's Land-precisely at the moment when they most needed the shells to be moving towards and across the German front line.[16]

This allowed the Germans to emerge from their dugouts and commence the massacre which then took place over the next eight hours. There is little proof to support Pisano's statements. On the contrary, there is plenty of testimony from British, French and even German commanders, from company to army level, that state that one of the most critical strengths of the BEF during the Battle of the Somme, was the RFC's ability to observe and direct accurate and timely artillery fires, both before and during the numerous attacks that the Fourth Army initiated during the five month campaign.[17]

Further proof to counter Pisano's argument lies in the fact that the techniques and procedures used by the RFC to observing and direct artillery in support of the Fourth Army, were codified and made doctrine. Haig's headquarters issued *Cooperation of Aircraft with Artillery* only weeks after the conclusion of the battle, in December 1916. The tenets and principles in the document remained in effect for the remainder of the war, only being revised to incorporate minor adjustments due to improved technology.[18]

The conduct of bombing missions also brought much more significant results than even the BEF or RFC had planned or hoped for. Bombing was much more concentrated than the raids conducted in 1915 and now including night missions. During the course of the battle, the RFC bombed 298 targets, dropped nearly 13,000 bombs in the first four days of the battle alone and 292 tons overall, in support of the Fourth Army.[19] Targets of critical importance to the conduct of the battle for the Germans, such as the railway networks at Marcoing, Epehy, and Velu, were bombed repeatedly with significant results. The most notable was the ammunition train at Aubigny-au-Bac, which was blown up by aircraft from Number 7 Squadron on 1 July. Another was the train station at St. Quentin where the German 22nd Reserve Division was prevented from entraining and moving to

the Somme front as hastily needed reinforcements, when their train was destroyed along with most of the division's arms and ammunition. The logistics centers of Cambrai and Bapaume were also continuously targeted and attacked. Supply centers at Grevillers, Irles, Le Transloy, Rancourt, St. Leger, and many others were also bombed repeatedly, as were both the First and Second Army headquarters.

As spectacular as the results of some of these incidents were, the greatest value Trenchard's bombing campaign achieved in supporting Rawlinson's army was that of diminishing the morale of the German soldier. Every day that the weather was fair, RFC bomber squadrons, flying in formation, could be seen flying across the German lines to attack targets deep in the enemy rear area. The same aircraft were seen returning within hours, usually having accomplished their mission without loss. It was only later in the campaign where bomber losses became severe, forcing Trenchard to provide escorts for them. However, there is ample evidence from German prisoners and documents that during the battle this in fact instilled a "spirit of defenseless" in many German infantrymen and caused much anger against the German Air Service for allowing the bombing to occur. At the same time it was extremely rare for the German infantry to see their own aircraft providing them support anywhere near the front lines, let alone crossing into British territory.[20]

The RFC flew "contact patrols" daily to support the infantry and though the system was not perfect, much was learned by both the infantry and the airmen, as the battle progressed. The techniques, procedures, and organization had been extremely successful. Rawlinson and his subordinate corps and division commanders were very impressed by the accuracy of the reports they received from the contact patrols regarding

the progress and location of attacking units and also on the actions and disposition of the enemy forces. Both the infantry and artillery chain of commands received this information via three ways. First, urgent messages requesting artillery fire were sent from the observer to the artillery headquarters via wireless. Second, a message bag was used for more detailed information, to include lithographed maps on which the observer had identified current friendly and enemy locations. The message bag was then dropped onto the respective corps or division headquarters. Last, upon landing, the observers delivered the report and if necessary, in person to corps headquarters to brief what they had seen. The contact patrol pilots normally flew at heights ranging from 500 to 1,000 feet, often putting themselves at risk to not only enemy fire but also friendly artillery fire. It is almost unbelievable that during some of the most intense artillery barrages in history, that took place during the Somme offensive, only one RFC aircraft was shot down by friendly fire. The wind itself often caused more problems for the contact patrols than the enemy did. The prevailing winds in northern France are westerly and often-times British pilots had to turn into the wind while over enemy lines and remain almost stationary while their observers noted what they saw. Such a sitting target always drew a barrage of fire.[21]

Ludendorff gave further praise to the RFC and its system of contact patrols, stating that during the Somme campaign British aircraft had caused great havoc amongst the German infantry by flying very low and using their machine guns on the troops crowded in the trenches. The wide spread negative effect on troop morale was far more of an impact on his forces than the casualties that occurred from the low level attacks.[22]

In December, several changes took place involving contact patrols, primarily focusing on means of communications. Using aircraft wireless to transmit friendly

positions would no longer be used as the Germans had developed wireless intercept techniques to listen in on the British frequencies. The use of wireless was restricted to requesting artillery fire under the Zone Call for Fire system. Another change involved the use of mirrors by the infantry, who had displayed them on their backs when advancing. There had been days during the Somme battle where mirrors had proven useful but there were too many objects on the battlefield that reflected light and thus this method proved unreliable. In its place the attacking infantry used flares to signal their progress. This method worked well and was thus adopted as the primary means for the ground forces to signal RFC aircraft. The one major drawback being that the enemy also used flares to signal its artillery.

Battalion and Brigade headquarters had used signal panels or lamps to communicate with aircraft and this method had also worked well. The only amendment was that in the future the personnel on the ground would use the clock-code method to send unit locations or targets to be attacked.[23] From the use of contact patrols the RFC and the Luftstreitkrafte, formed squadrons equipped with more durable aircraft, whose sole mission was to conduct attacks against ground units. By 1917-1918 these techniques to use airpower in a ground attack role would play a critical factor in the final battles to end the war. From the ground attack mission would develop what would later become known as Close Air Support.[24]

The sixth and final task assigned to the RFC was that of engaging in air combat with the Luftstreitkrafte. Trenchard believed this task was of critical importance and was the one mission that would ensure air supremacy. He also believed that the other five tasks could not be accomplished without achieving it.

Since the RFC engaged an offensive strategy before, during and after the Somme battle, seeking out enemy aircraft was termed Offensive Patrolling or O. P. for short. The offensive patrols were of two kinds. Those provided by the army squadrons- Number *22* (FE2bs) and Number *24* (DH2s) of the IV Brigade, flying behind the German front lines but still within sight of the corps squadron aircraft and two, the headquarters squadrons, Number *60* (Moranes), Number *27* (Martinsyde Scouts), and Number *70* (Sopwith 1 and 1/2 Strutter) up to twenty miles behind the German front lines. The IV Brigade was reinforced by five other squadrons from III Brigade to conduct both types of offensive patrolling during the duration of the Somme battle.[25]

Before the battle and up until Phase III (15 September-18 November), it was rare for the RFC to encounter a German aircraft that was seeking a fight. The work of the offensive patrols began to steadily increase once the Jagdstaffeln were formed and equipped with the new Albatros and Halberstadt fighters in September and October. The RFC strategy to seek combat, regardless of location or odds and deep behind enemy lines, was incomprehensible to the pilots of the Luftstreitkrafte. Lieutenant Baldemus, shot down and made prisoner just after the Battle of the Somme ended, commented on the contrast between the British and German pilots:

> You seem to be magnetically attracted to any German aeroplane you see, and never weigh the situation. I saw one of your machines take on one Fokker, then two Fokkers, then three Fokkers, before being shot down at Lille. We do not look for fights unless it is our duty. With us a machine should return without a fight, unless it is specifically sent up to fight. To return without a fight and with our work done, is the task with us.[26]

British fighter pilots, led by men like Hawker and Rees, could not fathom this type of thinking. To them it boarded on the edge of cowardice. The RFC had embedded in them an aggressive and direct approach to air combat. Hawker's orders issued the day

before the start of the offensive was typical of that aggressive approach: “Attack everything.”

Like Boelcke did for the Germans, Trenchard directed that his expert fighter pilots develop doctrine for air fighting. Hawker, Rees, and Captain Albert Ball (who would win the Victoria Cross in 1917), among many others, provided detailed input into several documents that the RFC codified and then disseminated to its pilots. The two most prominent were *Notes on Aeroplane Fighting in Single-Seater Scouts* in November 1916 and *Fighting in the Air* in March 1917. These tactical manuals for the conduct of air combat were so well thought out and developed that the procedures and techniques they described, survived until the jet age, some of it still applying to present day air combat operations.[27]

The sixth task, air combat with the Luftstreitkrafte, was based on Trenchard’s offensive based strategy of taking the air war deep into enemy territory. He knew that achieving aerial supremacy would not win the war on the ground but it could definitely assist the ground forces in accomplishing their immediate objectives of seizing the next trench line or fortified village. Without British air supremacy, the Luftstreitkrafte would not have needed to adhere to its defensive policy in the air, and like at Verdun, they could have taken the offensive, perhaps causing great damage to Rawlinson’s Fourth Army. The advances made on 1 and 14 July and those made up to and beyond 14 September, may never have happened had the RFC not maintained air supremacy over the Somme.

Trenchard has often been criticized for maintaining his offensive strategy, especially after the RFC lost the technological edge when the Germans introduced better fighter aircraft than those possessed by the RFC in September 1916. His September

memorandum, “Future Policy in the Air,” only hardened his position of maintaining the offensive by reiterating his belief that the aircraft was an offensive weapon and not a defensive one, he argued that regardless of developments in German aircraft performance or air policy, the RFC must attack and continue to attack. His strategy of relentless and incessant offensive action had forced the Germans to take a defensive position in the air. Trenchard had notified his chain of command that when a visionary leader took command of the German Air Service, or the enemy developed better and faster aircraft, the RFC would become even more aggressive, regardless of losses, as long as the British Army received the support it requested from its air service.

Trenchard’s strategy for the RFC to conduct unrelenting offensive patrols, deep behind enemy lines in inferior aircraft, especially after the introduction of the *Jagdstaffeln*, would be the cause of the great losses the RFC suffered in the last three months of the campaign. In September, the RFC lost 170 aircrews, thirty more than any other month from July to December. The RFC commander refused to acknowledge that the lack of effective aircraft and properly trained aircrews imposed limitations on his doctrine. On three occasions in September alone (15, 22, and 30), Trenchard, in writing, complained to Haig and the War Office, about the inadequate and outdated aircraft and poorly trained crews that he was receiving from England to replace his losses while it was apparent the Germans were forming new fighter squadrons for the Somme front, with well-trained, and very select pilots. Though he complained loudly, he was unyielding in the conduct of his offensive strategy, which further strained his inadequate resources, both in aircraft and aircrews. With the Germans achieving the technological edge in mid-September, Trenchard would not fathom relinquishing the initiative or his

offensive policy. There were several military and civilian leaders both in England and France who suggested that he refine his doctrine to allow the RFC some respite to rest and train aircrews and allow more time for the delivery of better aircraft such as the Sopwith Strutter and the new Sopwith Pup. Trenchard would not hear of altering his doctrine. He, just like Haig and many of the other British generals in command on the Western Front, supported a war of attrition and believed they could and would win it.[28]

As late as 10 September, the RFC was shooting down more German aircraft than it was losing, but the events of 17 September, where the British lost ten aircraft and their crews in less than five hours, alerted Trenchard and his squadron leaders that these heavy casualties, compounded by the new German fighter, had tipped the balance of losses in the Luftstreitkrafte's favor.

This brings us to the question on whether or not the cost in RFC aircrew lives was worth achieving air supremacy before and during the Battle of the Somme. From 1 July to 18 November, the RFC suffered 499 aircrew killed in action, wounded, or missing. Another 268 were nonbattle casualties (sickness, training accidents, or exhaustion). The RFC had lost more aircrew in the battle than it had on strength at the start of the battle (499 versus 426). In comparison the Luftstreitkrafte suffered 359 aircrew losses.[29] The RFC also lost more aircraft than it had to start the battle with. On 1 July the RFC had 410 serviceable aircraft. During the course of the campaign 190 aircraft were shot down, 173 were damaged and required extensive repairs at depot level and another 250 were removed from service due to obsolescence, bringing the total losses to 613 aircraft. On the positive side, by the end of the battle the RFC had grown to 38 squadrons with 550 operational aircraft.[30]

The offensive took a severe toll of RFC units in the battle. Number 70 Squadron, which flew long-range reconnaissance and offensive patrols in one of the best aircraft the British had at the time, the Sopwith 1 and 1/2 Strutter, suffered casualties between August and October that set a record within the RFC. After nine weeks in action, only nine of the original thirty-six pilots and observers had survived combat operations. Twenty-seven aircrew, plus twenty replacements, were killed in action, wounded, missing, or prisoners of war. The youngest had been seventeen, the oldest just twenty-two.

Trenchard was not overly concerned at the beginning of the campaign when he reported that the RFC was conducting three missions daily against 2 percent losses. Most of the British leadership (Haig, Henderson, Trenchard, and Brancker) presumed that the casualties would not continue at that level. Yet the RFC lost 20 percent of its force in the first week of July alone. The losses did drop over time but they remained sufficiently high--111 aircrew for the month of July, to cause concern about the availability of trained replacements. At the end of the battle Trenchard explained that while the RFC had suffered 100 percent casualties in eighteen weeks, it took only one casualty for every hundred times an aircraft crossed enemy lines, compared to one in three for the infantry when it crossed the lines. If nothing else, these statistics would have helped in a recruiting campaign for the RFC. The official historian summed it up another way: "the offensive which was relentlessly pursued in the air by the British air service was about four times more costly than the defensive policy adopted by the Germans."[31]

Malcolm Cooper, in his profound work *The Development of Air Policy and Doctrine on the Western Front, 1914-1918,* writes that by using a flexible defense

system, the Germans had a distinct advantage over the British in the war of attrition that was taking place in the air during 1916 and to the end of the war. By fighting almost always above their own territory, the Luftstreitkrafte was seldom brought to battle unless under their terms. If a German aircraft was damaged or the pilot wounded, and he could land his plane, both pilot and machine could be repaired and put back into the fight. If a British pilot or crew found themselves in the same circumstances the best they could hope for was to spend the rest of the war in a prisoner of war camp. This cumulative saving of personnel would prove even more significant when in 1918 the Germans began to issue parachutes to their aircrew (something the RFC refused to do except to their balloon observers). The Germans were thus able to maintain their investment in experienced, highly trained airmen, while the British, continually weakened by ever increasing levels of attrition, were not.[32] Cooper further wrote that Trenchard's offensive strategy was both inflexible and an overly dogmatic interpretation of the nature of offensive warfare.

Air Vice-Marshal Arthur Gould Lee, a fighter pilot with Number 46 Squadron in 1917-1918, summed up very candidly the strengths and weakness of Trenchard's strategy for the Somme campaign and the remainder of the war:

> General Trenchard was right to sustain an offensive spirit. Where he erred was in identifying this with an offensive strategy which was, in effect, a territorial offensive. To him, as to his staff, and most of his senior commanders, for a British aeroplane to be one mile across the trenches was offensive; for it to be ten miles over was more offensive. Influenced perhaps by naval doctrines-"seek out and destroy the enemy" and "our frontiers are the enemy coasts"-he applied them to the air, not appreciating that they were largely irrelevant in a three dimensional sphere. In the air fighting of World War I, despite the siege-like situation on the ground, it was not a fighter aeroplane's position in relation to a line of defences that measured the offensive spirit but the aggressive will of its occupants to attack the enemy wherever he was encountered, at whatever odds.[33]

Trenchard weathered the criticism both at home and in France on his adherence to the offensive strategy. The RFC did in fact suffer high losses but when the Battle of the Somme ended, it was the RFC who still controlled the skies above the Somme. The RFC accomplished all missions and tasks assigned it by both Haig and Rawlinson. In doing so, Trenchard had earned the respect, admiration, and support from the BEF's leaders. He proved to be a great leader with a strong and unwavering vision when the RFC needed one most. No other individual in the RFC offered the leadership and drive that he brought to it. Ralph Barker in his book *The Royal Flying Corps: From Mons to the Somme* states: "By taking the fight to the enemy even when losses seemed prohibitive, Trenchard stuck to his principles, relying on the tenacity and resilience of his air crews. They never failed him." [34]

The Battle of the Somme was a turning point for the RFC. Before the battle it was looked upon solely as a source for reconnaissance and observation. However, the Somme was its first air campaign fought against a well-led, well-equipped, and determined enemy in the Luftstreitkrafte. Despite the emergence of the twenty-five Jagdstaffeln by the end of the battle, the RFC had clung tenaciously to its supremacy of the air over the Somme. The cost was severe, but unfortunately, it was only the forerunner of what was to come in the spring of 1917.

The RFC had accomplished far more than Haig, Rawlinson and even Trenchard could have anticipated in supporting the Fourth Army and the BEF overall. The Somme air campaign was a victory for the RFC but more importantly its contribution to the war effort on the Western Front as a combat multiplier was now deemed by the ground commanders as absolutely essential in the coming campaigns to win the war.

[1]Christopher Martin, *Battle of the Somme* (East Sussex, England: Wayland Publishers Ltd., 1987), 103.

[2]John Boraston, ed., *Sir Douglas Haig's Despatches, December 1914-April 1919* (London: J. M. Dent and Sons Ltd., 1979), 54.

[3]H. A. Jones, *The War in the Air,* vol. 2 (London: Hamish Hamilton, 1969), 323.

[4]Ibid., 472.

[5]Hubert Gough, *The Fifth Army* (London: Hodder and Stoughton, 1931), 149.

[6]Erich von Ludendorff, *Ludendorff's Own Story,* vol. 1 (New York: Harper and Brothers Publishers, 1919), 316.

[7]Jones, 324-325.

[8]H. A. Jones, *The War in the Air,* vol. 3 (London: Hamish Hamilton, 1969), 307-310.

[9]Lee Kennett, *The First Air War, 1914-1918* (New York: The Free Press, 1991), 212.

[10]Dominick A. Pisano et al., *Legend, Memory and the Great War in the Air* (Seattle: University of Washington Press, 1992), 54-58.

[11]Ibid., 59.

[12]Ibid.

[13]Peter H. Liddle, *The 1916 Battle of the Somme: A Reappraisal* (London: Pen and Sword Books, Ltd., 1992), 134.

[14]Peter Hart, *Somme Success* (Barnsley, England: Pen and Sword Books Limited, 2001), 86-88.

[15]Ibid. Numerous other military historians support Liddle's findings. See also Denis Winter's *Haig's Command*; 59-62; Robin Prior and Trevor Wilson, *Command on the Western Front*, 172-176*;* A. H. Farrar-Hockley, *The Somme,* 125*;* Martin Middlebrook's *The First Day on the Somme,* 282-283*;* and Peter Hart's *Somme Success,* 86-89.

[16]Hart, 88-89.

[17]Jones, 324-326; Barker, 166-167; and Boyle, 197.

[18]Jones, vol. 3, 314.

[19]Jones, vol. 2, 472.

[20]Air Historical Branch, *The Royal Air Force in the Great War* (Nashville: The Battery Press, 1996), 127-129.

[21]Ibid., 125-126.

[22]von Ludendorff, 319.

[23]Jones, vol. 3, 316-317.

[24]Joseph H. Phelan, *Aircraft and Flyers of the First World War* (Cambridge, Patrick Stephens Ltd., 1974), 116-117.

[25]Air Historical Branch, *The Royal Air Force in the Great War* (Nashville: The Battery Press, 1996.), 129.

[26]John H. Morrow Jr., *The Great War in the Air: Military Aviation from 1909-1921* (Washington, DC: Smithsonian Institution Press, 1993), 170-171.

[27]Edward H. Sims, *Fighter Tactics and Strategy, 1914-1970* (Fallbrook, CA: Aero Publishers, Inc., 1980), 248-254.

[28]Ibid., 52-53.

[29]Morrow, 173.

[30]Jones, 471; Morrow 173; Revell 44.

[31]Trevor Wilson, *The Myriad Faces of War* (New York: Polity Press, 1986), 370.

[32]Malcolm Cooper, "The Development of Air Policy and Doctrine on the Western Front 1914-1918," *Aerospace Historian* (spring, March 1981): 45-46.

[33]Arthur Gould Lee, *No Parachute: A Fighter Pilot in World War I* (New York: Harper and Row Publishers, 1968), 217.

[34]Ralph Barker, *The Royal Flying Corps: From Mons to the Somme* (London: Constable and Company, Ltd., 1994), 189.

APPENDIX A

RFC FORMATION TACTICS, 1916

1. Line Abreast: Four or more aircraft aligned with the flight leader who was positioned on the right or left flank. All aircraft maintained about a fifty-yard spacing between machines. It was a good formation to maintain and at the same time keep watch for enemy aircraft. By leading from the flank the flight leader of single-seater aircraft had three pairs of eyes searching that flank. A drawback was that the number four aircraft was far more vulnerable to attack than the leader or number two. This weakness was not true of two-seaters, because the four observers maintained a careful lookout behind and, as far as possible, below. Except for one maneuver, the pilots found that the line abreast was a fairly safe formation to fly for they could transition into echelon or line astern without much risk. The left turn, pivoting of the flight leader, was easy, but the right turn was very awkward, and each pilot had to watch the others very carefully to maintain their correct distance to prevent collision. By the end of the First World War this risk was all but eliminated when the flight leader led from the center instead of the flank.

2. Line Astern: The easiest formation to fly because it was basically the air equivalent of the children's game of "Follow the Leader." Young and inexperienced pilots had little trouble in following the flight leader and imitating whatever aerobatics he chose as long as he flew accurately and allowed them a fair margin of speed. It was a very safe formation, because the pilots turned and wheeled after each other and not at the same time, as in line abreast. Because the forward and upward view from their biplanes was restricted, they flew stepped up from front to rear, which had the added advantage that if anyone lagged behind he could convert height into speed and catch up by diving

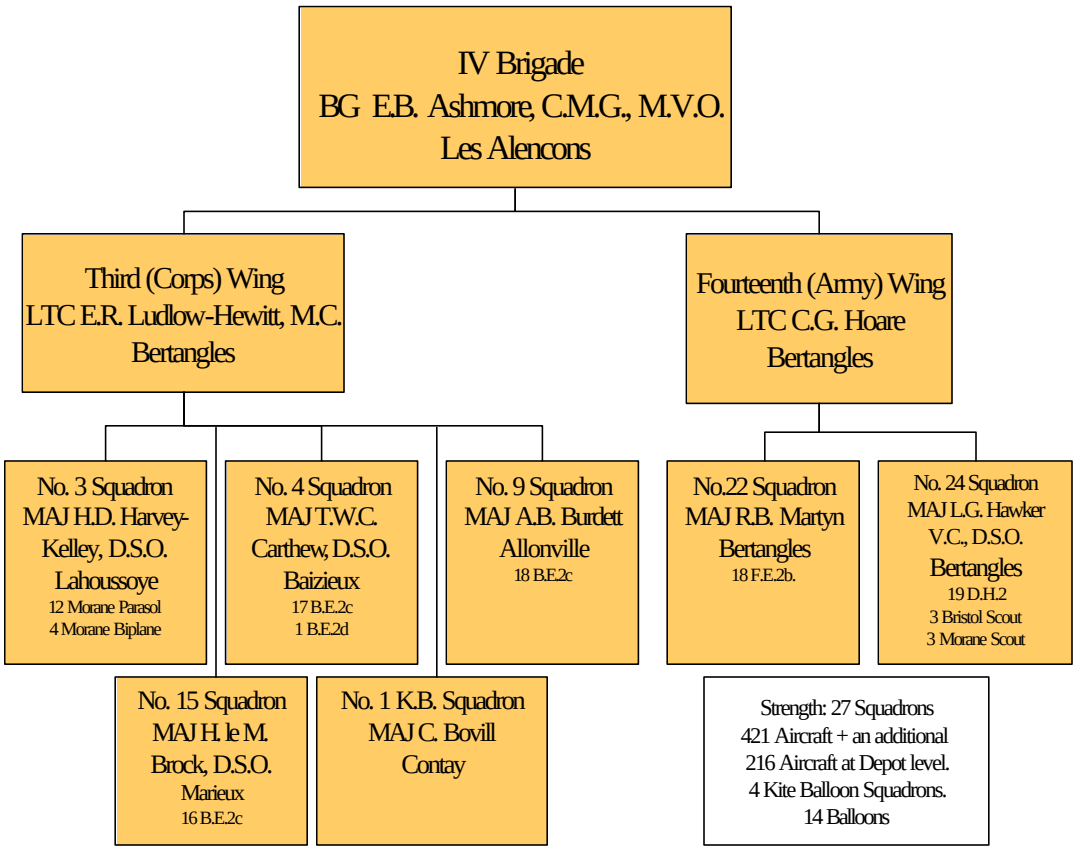
towards the leader. It was also considered a good bombing formation, because if the two-seaters flew close together their bombs could straddle the target. However for single seaters the tremendous disadvantage was that number two, three and four spent a lot of time watching the airplane ahead and had very little opportunity to keep a careful lookout; consequently it was a vulnerable combat formation, and the number four man usually was the first to be attacked by an enemy formation. A lesson, learned the hard way by the RFC during the air battle over the Somme, was to not put an in-experienced pilot in the number four position as often he was shot down before the rest of the flight were aware they were being attacked.

3. Echelon: A good formation that was often used because hand signals could easily be passed from pilot to pilot. The drawback was that it was hard to maintain even spacing between aircraft, and any slight alteration of the flight leader's course threw the other three machines off course. Also if, for any reason, the leader suddenly turned inwards, there was a serious danger of a collision, and it was soon found that echelon was not as safe a formation as either line abreast or line astern.

APPENDIX B

ROYAL FLYING CORPS ORDER OF BATTLE:
1 JULY 1916 BATTLE OF THE SOMME

Order of Battle, Royal Flying Corps
1 July 1916 (Somme)
in support of Fourth Army (General Sir Henry Rawlinson)



APPENDIX C

FUTURE POLICY IN THE AIR: SEPTEMBER 1916

Since the beginning of the recent operations the fighting in the air has taken place over the enemy's line, and visits of hostile aeroplanes over our lines have been rare. It is hoped that this state of things may continue, but as one can never be certain of anything in war, it is perhaps an opportune moment to consider what policy should be adopted were this state of affairs to change, and were the enemy to become more enterprising and more aggressive.

It I sometimes argued that our aeroplanes should be able to prevent hostile aeroplanes from crossing the line, and this idea leads to a demand for defensive measures and a defensive policy. Now is the time to consider whether such a policy would be possible, desirable, and successful.

It is the deliberate opinion of all those most competent to judge that this is not the case, and that an aeroplane is an offensive weapon and not a defensive weapon. Owing to the unlimited space in the air, the difficulty one machine has in seeing another, the accidents of wind and cloud, it is impossible for aeroplanes, however skilful and vigilant their pilots, however powerful their engines, however mobile their machines, and however numerous their formations, to prevent hostile aircraft from crossing the line if they have the initiative and determination to do so.

The aeroplane is not a defence against the aeroplane; but it is the opinion of those most competent to judge that the aeroplane, as a weapon of attack, cannot be too highly estimated.

A signal instance of this fact is offered to us by the operations which took place in the air at Verdun.

When the operations at Verdun began, the French had few machines on the spot. A rapid concentration was made, and a vigorous offensive policy was adopted. The result was that superiority in the air was obtained immediately, and the machines detailed for artillery co-operation and photography were enabled to carry out their work unmolested, but as new units were put into the line which had less experience of working with aeroplanes, a demand arose in some quarters for machines of protection, and these demands were for a time complied with. The result was that the enemy took the offensive, and the French machines were unable to prevent the hostile raids which the enemy, no longer being attacked, was now able to make. The mistake was at once realized and promptly rectified. A policy of general offensive was once more resumed, and the enemy at once ceased to make hostile raids, all his time being taken up in fighting the machines which were now attacking him. Superiority in the air was once more regained.

On the British front, during the operations which began with the battle of the Somme, we know that, although the enemy had concentrated the greater part of his available forces in the air on this front, the work actually accomplished by their aeroplanes stands, as compared with the work done by us, in the proportion of 4 to 100. From the accounts of prisoners we gather that the enemy's aeroplanes have received orders not to cross the lines over the French or British front unless the day is cloudy and a

surprise attack can be made, presumably in order to avoid unnecessary casualties. On the other hand, British aviation has been guided by a policy of relentless and incessant offensive. Our machines have continually attacked the enemy on his side of the line, bombed his aerodromes, besides carrying out attacks on places of importance far behind the lines. It would seem probable that this has had the effect so far on the enemy of compelling him to keep back or to detail portions of his forces in the air for defensive purposes.

When Lille station was attacked from the air for the first time no hostile aeroplanes were encountered. The second time this place was attacked our machines encountered a squadron of Fokkers which were there for defensive purposes. This is only one instance among many.

The question which arises is this: Supposing the enemy, under the influence of some drastic reformer or some energetic leader, were now to change his policy and follow the example of the English and French, and were to cease using his aeroplanes as a weapon of defence and to start a vigorous offensive and attacks as many places as far behind the our lines as he could, what would be the sound policy to follow in such a case? Should we abandon our offensive, bring back our squadrons behind the line to defend places like Boulogne, St. Omer, Amiens, and Abbeville, and protect our artillery and photographic machines with defensive escorts, or should we continue our offensive more vigorously than before? Up to now the work done by the Germans compared with that done by our aeroplanes stands, as we have seen, in the proportion of 4 to 100; but let us suppose that the enemy initiated a partial offensive in the air, and that his work increased, compared with ours, to a proportion of 30 or 50 to 100, it is then quite certain that a demand for protective measures would arise for protective squadrons and machines for defensive patrols.

One of the causes of such demands is the moral effect produced by a hostile aeroplane, which is out of all proportion to the damage which it can inflict.

The mere presence of a hostile machine in the air inspires those on the ground with exaggerated forebodings with regard to what the machine is capable of doing. For instance, at one time on one part of the front, whenever a hostile machine, or what was thought to be a hostile machine, was reported, whistles were blown and men hid in the trenches. In such cases the machines were at far too great a height to observe the presence of men on the ground at all, and even if the presence of men observed it would not lead to a catastrophe. Again, a machine which was reported in one place would certainly, since it was flying rapidly, be shortly afterwards observed in another part of the lines and reported again, but the result of these reports was often that for every time the machine was sighted a separate machine was reported, leading at the end of the day to a magnified and exaggerated total.

The sound policy then which should guide all warfare in the air would seem to be this: to exploit this moral effect of the aeroplane on the enemy, but not let him exploit it on ourselves. Now this can only be done by attacking and continuing to attack.

It has been our experience in the past that at a time when the Germans were doing only half the work done by our machines that their mere presence over our lines produced an insistent and continuous demand for protective and defensive measures.

If the Germans were once more to increase the degree of their activity even up to

what constitutes half the degree of our activity, it is certain that such demands would be made again.

On the other hand, it is equally certain that, were such measures to be adopted, they would prove ineffectual. As long as a battle is being fought, any machine at the front line has five times the value that the same machine would have far behind the lines.

If the enemy were aware of the presence of a defensive force in one particular spot he would leave that spot alone and attack another, and we should not have enough machines to protect all the places which could possibly be attacked behind our lines, and at the same time continue the indispensable work on the front.

But supposing we had enough machines both for offensive and defensive purposes. Supposing we had an unlimited number of machines for defensive purposes, it would still be impossible to prevent hostile machines from crossing the line if they were determined to do so, simply because the sky is too large to defend. At seas a number of destroyers will have difficulty in preventing a hostile destroyer, and still more a hostile submarine, from breaking the blockade. But in the air the difficulty of defence is still greater, because the area of possible escape is practically unlimited, and because the aeroplane is fighting in three dimensions.

The sound policy would seem to be that if the enemy changes his tactics and pursues a more vigorous offensive, to increase our offensive, to go farther afield, and to force the enemy to do what he would gladly have us do now. If, on the other hand, we were to adopt a purely defensive policy, or a partially offensive policy, we should be doing what the French have learnt by experience to be a failure, and what the rank and file of the enemy, by their own accounts, point to as being one of the main causes of their recent reverses.

Moreover, in adopting such a policy it appears probable that the Germans are guided by necessity rather than by choice, owing to the many fronts on which they now have to fight, and owing also to the quality and the quantity of machines they have to face on the Western Front alone. Nevertheless, one cannot repeat too often that in war nothing is certain, and that the Germans may, either owing to the pressure of public opinion, or the construction of new types of machines, or the rise of a new leader, change their policy at any moment for a more aggressive one.

Advanced Headquarters
Royal Flying Corps
22 September 1916

APPENDIX D

BOELCKE'S DICTA ON AIR FIGHTING

1. Always try to secure an advantageous position before attacking. Climb before and during the approach in order to surprise the enemy from above, and dive on him swiftly from the rear when the moment to attack is at hand.
2. Try to place yourself between the sun and the enemy. This puts the glare of the sun in the enemy's eyes and makes it difficult to see you and impossible for him to shoot with any accuracy.
3. Do not fire the machine guns until the enemy is within range and you have him squarely within your sights.
4. Attack when the enemy least expects it or when he is pre-occupied with other duties such as observation, photography or bombing.
5. Never turn your back and try to run away from an enemy fighter. If you are surprised by an attack on your tail, turn and face the enemy with your guns.
6. Keep your eye on the enemy and do not let him deceive you with tricks. If your opponent appears damaged follow him down until he crashes to be sure he is not faking.
7. Foolish acts of bravery only bring death. The Jasta must fight as a unit with close teamwork between all pilots. The signals of its leaders must be obeyed.

APPENDIX E

HAIG'S LETTER TO THE WAR OFFICE 30 SEPTEMBER 1916

I have the honour to request that the immediate attention of the Army Council may be given to the urgent necessity for a very early increase in the numbers and efficiency of the fighting aeroplanes at my disposal. Throughout the last three months the Royal Flying Corps in France has maintained such a measure of superiority over the enemy in the air that it has been enabled to render services of incalculable value. The result is that the enemy has made extraordinary efforts to increase the number, and develop the speed and power, of his fighting machines. He has unfortunately succeeded in doing so and it is necessary to realize clearly, and at once, that we shall undoubtedly lose our superiority in the air if I am not provided at an early date with improved means of retaining it. Within the last few days the enemy has brought into action on the Somme front a considerable number of fighting aeroplanes which are faster, handier, and capable of attaining a greater height than any at my disposal with the exception of one squadron of single-seater Nieuports, one of F.E. Rolls Royce, and one of Sopwiths,-the last mentioned being inferior to the enemy's new machines in some respects though superior in others. All other fighting machines at my disposal are decidedly inferior. The result of the advent of the enemy's improved machines has been a marked increase in the casualties suffered by the Royal Flying Corps, and though I do not anticipate losing our present predominance in the air for the next three or four months, the situation after that threatens to be very serious unless adequate steps to deal with it are taken at once. I have directed the G.O.C. Royal Flying Corps in France to put forward a statement of our estimated requirements."

In a personal letter to Sir William Robertson, Chief of the Imperial General Staff, written the same day, Sir Douglas Haig pointed out that the jump in RFC losses in the last two weeks of September meant that "we were now doing less distant fighting with the result that an increasing number of German machines now come up to the lines, and a few cross them, whereas practically no German machines crossed the line in the first two months of the battle. It is the fighting far behind the enemy's lines that tells most."

APPENDIX F

ROYAL FLYING CORPS STATISTICS FOR THE BATTLE OF THE SOMME
1 JULY–17 NOVEMBER 1916

Aircraft

Serviceable on1 July:	410 (219 were artillery spotting aircraft)
Serviceable on 17 November	550 (299 were artillery spotting aircraft)
Destroyed (combat or in accidents)	782
Missing	190
Completely rebuilt at Depot	173
Returned to England	178
Flown to England	57
Flown from England	867
Flown from Paris	139
Average rate of replacement in squadrons (per month)	10
Engines repaired at Pont de l'Arche	537

Pilots

Available on 1 July	426
Available on 17 July	585
Killed, wounded, or missing	308
Non battle casualties	268

Observers

Killed, wounded, or missing.	191

Squadrons

1 July	27
17 November	35

Balloons

1 July	14
17 November	35

Wireless

Ground stations	542

Wireless (continued)

Operators on 1 July	689
Operators on 17 November	883
Operator casualties	27
Aircraft fitted with	306

Bombing

Raids with definite targets	298
Number of bombs dropped	17,600
Weight of bombs dropped	292 tons

Photography

Photographs taken	19,000
Prints of photographs made	420,000

Artillery Co-operation

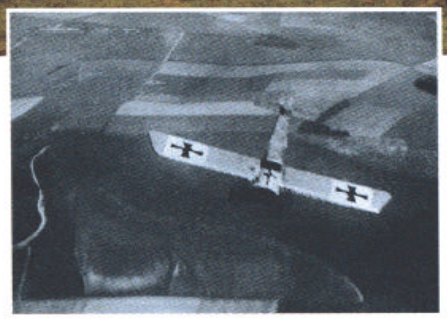
Targets registered with air observation	8,612

Hostile aircraft

Destroyed	164
Driven down damaged	205

APPENDIX G

KEY BRITISH AND GERMAN FIGHTER AIRCRAFT USED DURING THE AIR BATTLE OVER THE SOMME



Fokker Eindecker

The Fokker E (Eindecker or monoplane) was significant because it was the first combat aircraft to be equipped with interrupter gear that allowed bullets from a fixed machine-gun to be fired safely between the spinning blades of a propeller. This gave the Eindecker pilots a significant advantage over their Allied adversaries, who still had to manoeuvre their aircraft into a firing position and then aim their moving guns manually. The interrupter gear synchronized the Eindecker's single gun with the propeller blades so that once the aircraft was pointed at a target, so was the gun.

The Eindecker, not a remarkable aircraft, was developed from the pre-war M.5 design and relied on "wing-warping" for lateral control, but the technical advantage of a single synchronized gun allowed its pilots to rack up a significant number of aerial victories, beginning on August 1, 1915, when the legendary German ace Max Immelmann achieved his and the Eindecker's first "kill". Over the following weeks Royal Flying Corps pilots were alarmed to come across these single-seat "fighters" that could fire along their own line of flight. This was the beginning of a period of German air supremacy over the Western Front that came to be known as the "Fokker Scourge". The Eindecker, with its innovative armament, gave pilots like Immelmann and Oswald Boelcke a string of victories that made them national heroes in their homeland and possibly the first well-known fighter aces.

In spite of this, for a number of reasons the Eindecker never reached its full potential as a weapon. German paranoia about the "secret" of the interrupter gear falling into British hands made them forbid the use of the Eindeckers over enemy territory. Also, the Eindeckers were only allocated as individual aircraft to fly escort for two-seater aircraft. Production problems meant that even though they were clearly very significant aircraft, there were less than a hundred in service by the end of 1915. Nevertheless, Eindecker pilots honed their tactics and eventually began to operate in fours, while a more organized ground control system had them vectored to airspace where enemy aircraft were known to be. The result was that by the end of 1915 a small number of Eindeckers had effectively removed the enemy's ability to carry out reconnaissance missions. Meanwhile two lone Eindeckers on the Eastern Front kept the Imperial Russian Air Service in their area at bay.

The tactical advantage enjoyed by the Fokker E series (later Es, the EII, III and IV had more powerful engines and/or an additional gun) came to an end, as Allied designers produced purpose-built fighters to counter the "Fokker Scourge" and Eindeckers were gradually replaced during 1916, but they are thought to have destroyed over 1000 Allied aircraft in their short time of supremacy.

TOP: **The very effective Fokker Eindecker destroyed over 1000 Allied aircraft.** ABOVE: **The period of Eindecker supremacy over the Western Front was known as the "Fokker Scourge".**

Fokker Eindecker

First flight: 1913 (M.5)
Power: Oberursel 100hp U.I nine-cylinder rotary piston engine
Armament: One fixed forward-firing 7.92mm/0.31in machine-gun
Size: Wingspan – 9.5m/31ft 2.75in
Length – 7.2m/23ft 7.5in
Height – 2.4m/7ft 10.5in
Wing area – 16m²/172.23sq ft
Weight: Empty – 399kg/880lb
Maximum take-off – 610kg/1345lb
Performance: Maximum speed – 140kph/87mph
Ceiling – 3500m/11,480ft
Range – 1.5 hours endurance
Climb – 3000m/9845ft in 30 minutes

Source: Francis Crosby, *A Handbook of Fighter Aircraft* (London: Anness Publishing Limited, 2002), 70.

LEFT: **The widely produced Albatros D.Va was an early example of fuselage streamlining.**
BELOW: **In early 1917 the D.I won air superiority for the Germans over the Western Front.**

Albatros D. Fighters – I, II, III, V, Va

The D series of Albatros fighters illustrates very well just how short-lived air superiority could be over the Western Front in World War I. As one side introduced a more effective type and achieved the upper hand, the enemy would develop a superior aircraft and very quickly redress the balance. The D.V was the last of a line of Albatros fighters that began with the D.I, developed into the D.II and then the D.III. As each version joined the fray it enjoyed only relatively short-lived success.

The Albatros D.I was introduced by the Germans to counter the Allied de Havilland and Nieuport fighting scouts, which had ended the "Fokker Scourge" of early 1916 and regained air superiority from the Germans. The D.I played a major role in swinging the pendulum back in favour of the Germans in early 1917. Apart from the fuselage, the D.I was built using components or building methods employed in the Albatros C series. The fighter's fuselage was elliptical in section and represented an advance in aerodynamic design over the earlier models.

The aircraft was powered by either a Benz Bz.III or a Mercedes D.III engine, which were then the most powerful engines fitted in a scout. This, coupled with the fact that the D.I was armed with two synchronized machine-guns, made it a hard-hitting fighter capable of climbing to 1000m/3280ft in six minutes – an impressive climb rate for the time. These factors made it attractive to the German "top guns" of the time, such as von Richthofen and Boelcke, who used the aircraft to regain air superiority for the Germans over the Western Front.

The D.II introduced a few fundamental improvements, including the lowering of the top wing so that the pilot could see over it and the aerodynamically improved installation of the radiator in the upper wing centre section. Climbing to 1000m/3280ft now took a mere five minutes.

The D.III was an improved version of the D.II, designed for better manoeuvrability. Changes to the wing set-up required the introduction of v-shaped struts between the upper and lower wings to improve rigidity. By late 1917 the D.III was in turn outclassed by the newer Allied fighters like the S.E.5 and was replaced by the D.V, the ultimate Albatros. The D.V had a wonderfully streamlined plywood-skinned fuselage and was produced in vast numbers. Over 1500 alone served on the Western Front, making up for any combat shortcomings by sheer weight of numbers. Heavy losses were experienced, not only as a result of enemy action but also to the Albatros's tendency to break up in flight, due to inherent structural weaknesses in the lower wing.

ABOVE: **The D.II had its upper wing lowered so that the pilot could see over the top.**

Albatros D.V

First flight: Spring 1917
Power: Mercedes 180hp DIIa six-cylinder in-line engine.
Armament: Two belt-fed fixed 7.92mm/0.31in Spandau machine-guns
Size: Wingspan – 9.05m/29ft 8in
Length – 7.33m/24ft 0.5in
Height – 2.7m/8ft 10.25in
Wing area – 21.28m²/229sq ft
Weights: Empty – 687kg/1511lb
Maximum loaded – 937kg/2061lb
Performance: Maximum speed – 187kph/116mph
Ceiling – 5700m/18,700ft
Range – 2 hours endurance
Climb – 1000m/3280ft in 4 minutes

Source: Francis Crosby, *A Handbook of Fighter Aircraft* (London: Anness Publishing Limited, 2002), 46.

Vickers F.B.5

The Vickers F.B.5, nicknamed "Gun Bus", was directly developed from one of the world's first combat aircraft, the Vickers Destroyer, and was designed to meet a late 1912 British Admiralty specification for a machine-gun armed fighting aeroplane. It was the first British aircraft to mount a machine-gun. The two-seat F.B.5 was, like the F.E.2, a pusher aircraft, that is the propeller was used to push from behind rather than pull from the front. With no propeller in the way, the front seat was given to the gunner/observer while the pilot occupied the rear seat.

Although the first of these planes arrived on the Western Front in February 1915 it was not until July 25, 1915 that No.11 Squadron, Royal Flying Corps, arrived in France. No.11 was the world's first squadron formed for fighting duties and it was equipped throughout with one aircraft type – the Vickers F.B.5.

This slow but strong machine fought well but F.B.5 crews were wise to keep away from the faster and better-armed Fokker E. Combat reports of the time regularly state that enemy aircraft simply got away due to their better speed.

After a few months of combat the F.B.5 was withdrawn from front-line duties and was used for training purposes back in Britain.

ABOVE: **The relatively slow F.B.5 could be vulnerable. This No.18 Squadron RFC "Gun Bus" was shot down on December 29, 1915 by anti-aircraft fire.**

BELOW: **An F.B.5 replica pictured at the Royal Air Force Museum in Britain.**

Vickers F.B.5

First flight: October 1914 (production F.B.5)
Power: Gnome Monosoupape 100hp rotary engine
Armament: One 7.7mm/0.303in machine-gun aimed from front cockpit
Size: Wingspan – 11.13m/36ft 6in
Length – 8.2m/27ft 2in Height – 3.51m/11ft 6in
Wing area – 35.5m²/382sq ft
Weights: Empty – 553kg/1220lb
Maximum take-off – 930kg/2050lb
Performance: Maximum speed – 113kph/70mph
Ceiling – 2745m/9000ft
Range – 386km/240 miles
Climb – 122m/400ft per minute

Source: Francis Crosby, *A Handbook of Fighter Aircraft* (London: Anness Publishing Limited, 2002), 144.

de Havilland/Airco DH.2

LEFT: **Four DH.2s of No.32 Squadron, Royal Flying Corps at Vert Galland, France, 1916.** BELOW: **A replica DH.2, showing the gun fixed in the front of the aircraft.** BOTTOM: **The DH.2 was vital to winning back control of the air in early 1916.**

In June 1914 Airco hired talented young designer Geoffrey de Havilland, later founder of the company that bore his name, to head their design department and the DH.2 was his second project for the company. The first had been the DH.1 two-seat reconnaissance fighter and the DH.2 was simply a smaller version of it for a one-man crew. The DH.2 used an air-cooled rotary engine instead of the DH.1's water-cooled in-line engine but kept the "pusher" configuration, with the propeller facing behind the aircraft. This was due to the fact that in early 1915 a means had not yet been perfected that would allow a gun to shoot forwards between the spinning blades of propeller blades.

The armament arrangement seems bizarre by today's standards, consisting of a Lewis gun which could be mounted on either side of the cockpit as the pilot wished. He did of course have to manhandle the gun (that weighed 8kg/17.5lb) to the other side if an enemy presented himself there, all while still trying to control the aircraft. The gun was later mounted at the front of the aircraft on the centre line and was normally used as a fixed weapon, aimed by aiming the aircraft itself.

Nevertheless the DH.2 was praised by its pilots for its responsiveness and excellent rate of climb, and the aircraft was certainly central to winning back control of the air over the Western Front in early 1916.

Around 450 were built, but the tide began to turn again, and the DH.2 was outclassed by the latest German fighters by late 1916. The type was eventually withdrawn from March 1917 but not before No.29 Squadron lost five out of six DH.2s in one engagement, with five of the new Albatros D.IIIs on December 20, 1916.

Airco DH.2

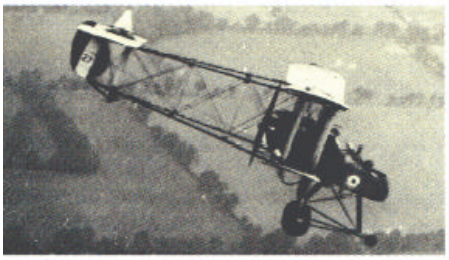
First flight: Spring 1915
Power: Gnome Monosoupape 100hp nine-cylinder rotary piston engine
Armament: One 7.7mm/0.303in Lewis machine-gun
Size: Wingspan – 8.61m/28ft 3in
Length – 7.68m/25ft 2.5in
Height – 2.91m/9ft 6.5in
Wing area – 23.13m²/249sq ft
Weights: Empty – 428kg/943lb
Maximum take-off – 654kg/1441lb
Performance: Maximum speed – 150kph/93mph
Ceiling – 4265m/14,000ft
Range – 2 hours, 45 minutes endurance
Climb – 1830m/6000ft in 11 minutes

Source: Francis Crosby, *A Handbook of Fighter Aircraft* (London: Anness Publishing Limited, 2002), 61.

Royal Aircraft Factory F.E. series

The Royal Aircraft Factory first started building the F.E.2 (F.E. stood for Fighter Experimental) in 1913. The F.E.2 was what was known as a pusher aircraft, that is the propeller was used to push from behind rather than pull from the front as in tractor aircraft.

The pusher arrangement was born, in the days before the invention of interrupter gear, of the need for a forward-firing gun



and the removal of the propeller, which tended to get in the way of the bullets. With no propeller in the way, the front seat was given to the gunner/observer while the pilot occupied the rear seat. Disadvantages of the pusher arrangement included the danger of anything flying out of the aircraft hitting the propeller, sometimes damaging or destroying it. Although the engine could protect the pilot if attacked from behind, in the event of a nose-down crash the engine and associated fuel tended to land on top of the two-man crew.

Early Fees, as they were known, had a 100hp engine which was soon replaced in the F.E.2b by a 120hp Beardmore engine. This was itself later supplanted by 160hp Beardmores which improved the aircraft's top speed and performance. The ultimate development of the Fee was the F.E.2d powered by a 250hp Rolls-Royce engine.

In combat the F.E.2b, along with the Airco D.H.2, kept the Fokkers at bay and it was an F.E.2b that shot down the German ace Max Immelmann in June 1916. This version was however soon outclassed by the latest German Albatros and Halberstadt fighting scouts so the F.E.2d was brought to the Front in 1916. F.E.2bs did however serve until the end of the war on UK home defence against Zeppelins and Gotha bombers.

Royal Aircraft Factory F.E.2b

First flight: August 1913 (F.E.)
Power: Beardmore 120hp in-line piston engine
Armament: Up to two 7.7mm/0.303in machine-guns
Size: Wingspan – 14.55m/47ft 9in
Length – 9.83m/32ft 3in
Height – 3.85m/12ft 7.5in
Wing area – 45.89m²/494sq ft
Weights: Empty – 904kg/1993lb
Maximum take-off – 1347kg/2970lb
Performance: Maximum speed – 129kph/80mph
Ceiling – 2745m/9000ft
Range – 3 hours endurance
Climb – 3050m/10,000ft in 51 minutes, 45 seconds

ABOVE: **This F.E.2b, serial A5666, is shown minus the usual nosewheel installation.** LEFT: **A rare air-to-air shot of a "Fee" in its element.** BELOW: **An F.E.2d of No.20 Squadron, Royal Flying Corps, pictured in 1916.**

The single-seat F.E.8 pusher biplane was developed again because of the lack of an effective British interrupter gear and entered service on the Western Front in August 1916. Although lighter and more manoeuvrable than the F.E.2, the F.E.8 was no better a fighter as the pilot had to deal with the machine-gun (which was prone to stoppages) while still flying the aircraft and looking for the enemy. Nine F.E.8s were effectively destroyed in a single engagement with a formation led by Baron von Richthofen and by mid-1917 all F.E.8s were withdrawn from front-line use.

Royal Aircraft Factory F.E.8

First flight: October 15, 1915
Power: Gnome Monosoupape 100hp rotary piston engine
Armament: One 7.7mm/0.303in machine-guns
Size: Wingspan – 9.6m/31ft 6in
Length – 7.21m/23ft 8in
Height – 2.79m/9ft 2in
Wing area – 20.25m²/218sq ft
Weights: Empty – 406kg/895lb
Maximum take-off – 610kg/1345lb
Performance: Maximum speed – 151kph/94mph
Ceiling – 4420m/14,500ft
Range – 2 hours, 30 minutes endurance
Climb – 1830m/6000ft in 9 minutes, 28 seconds

Source: Francis Crosby, *A Handbook of Fighter Aircraft* (London: Anness Publishing Limited, 2002), 134.

GLOSSARY

Abteilung. Unit, detachment, or section.

Artillerie Flieger Abteilungen. Artillery flying unit or flight.

Feldflieger Abteilungen. Field Aviation unit, reconnaissance.

Flieger Abteilung. Aviation unit, or section.

Flieger Abteilung (A). Aviation unit for cooperation with artillery.

Flieger Abteilung(A)(No)Lb. Same as above but for photo-reconnaissance

Gruppenfuhrer der Flieger (Grufl) Officer attached to Corps headquarters responsible for the best utilization of aviation units assigned to the corps.

Jagdgeswader. A permanent organization consisting of four Jagdstaffeln totaling approximately 50 aircraft.

Jagdstaffel (Hunting Squadron). A Fighter unit, usually consisting of 14 aircraft.

Kampfeinsitzer Abteilung. Single-seat fighter units.

Kampfeinsitzer Kommando. Single-seat fighter detachment or flight.

Kampfgeschwader. Fighter-bomber unit.

Kampfstaffeln. Fighter-bomber flight.

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